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TROPICAL DISEASES BULLETIN

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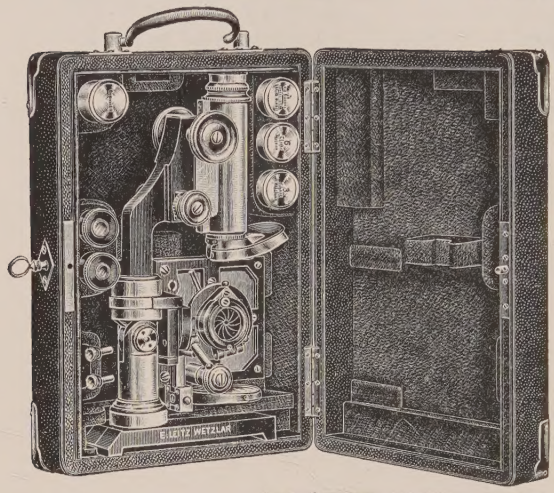

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TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 2.] 1913. [No. 10.

PELLAGRA.

SILER (Joseph F.) & GARRISON (Philip E.). **An Intensive Study of the Epidemiology of Pellagra. Report of Progress.**—*Amer. Jl. of the Med. Sciences.* 1913. July. Vol. 146. No. 1. (No. 496.) pp. 42-66; and Aug. No. 2. (No. 497.) pp. 238-277.

This is a preliminary report of the epidemiological work of the Thompson-McFadden Pellagra Commission during 1912, which was continued in 1913. Spartanburg County in South Carolina was selected for intensive study within a limited area. The Commission studied 282 cases between June and October and found three females to every male attacked. It is believed that household association, which may or may not include family relationship, is an important factor in the distribution of pellagra.

There is the history of a woman who died apparently from pellagra in 1894, but the disease was not recognized in the county until 1909. During 1912 there were 376 cases, including those which had been returned in former years; of this number 12 per cent. died. It is to be noted that 5 per cent. died during the initial attack contracted in 1912. It is suspected that pregnancy inhibits the development of pellagrous symptoms, but on the other hand the list of recent illnesses "possibly predisposing to pellagra" is headed by the entry "general poor health (usually following childbirth)." [An apparent improvement during pregnancy followed by deterioration after childbirth reminds one of certain cases of phthisis.] Only one case of uncinariasis was encountered.

The report includes several diagrams and photographs of wells and of typical houses of patients, all vastly superior to the dwellings of Italian and Egyptian peasants. But these Spartanburg "houses are practically infested with *Cimex*, and the grooves between the boards used in sealing the rooms afford an ideal place for the hatching out of broods of these insects." The domestic fly was present in all and *Stomoxys calcitrans* very often.

Bacon (cured pork) is eaten "either daily or habitually by 92 per cent. of the mill-village group, 87 p.c. of the rural group, and 76 p.c. of the urban group." "We are quite certain, from

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personal observation, that the average dietary of the poorer classes of the population in the county studied is much superior both in its variety and actual nutritive value to the dietary of the peasants in the North of Italy." In 83 per cent. of the cases examined economic conditions were bad, and pellagra was found to be most prevalent among people of insufficient means.

Investigation failed to discover any epidemiological evidence pointing to maize as an etiological factor and two cases were met with which denied all maize consumption for two years before the onset of symptoms.

F. M. Sandwith.

Lavinder (C. H.). **Pellagra. Prevalence and Geographic Distribution in Arkansas, Oklahoma, and Texas.** — *U.S. Public Health Rep.* 1913. July 25. Vol. 28. No. 30. pp. 1555-1558.

This is an official postscript to the article published on December 13, 1912, relating to the prevalence of pellagra in the United States (see this *Bulletin*, Vol. 1, p. 299). 4,045 cases are now added, of which more than two-thirds occurred in Texas. These figures bring the total number recorded between 1907 and 1912 to 19,915, with the enormous death-rate of 40·59 per hundred reported cases. In the State of Oklahoma this calculated death-rate reached the maximum of 54·91; most of these reported cases were in white people. These three States lie somewhat on the border of what was thought to be the intensive pellagra area. "This suggests rather strongly that pellagra is increasing the area in which it is present and invading new territory."

F. M. S.

Beall (K. H.). **Pellagra.**—*Texas State Jl. of Med.* 1913. Aug. Vol. 9. No. 4. pp. 129-131.

As an instance of the danger which pellagra is to a virgin country the author states that this disease in the one State of Alabama killed 446 people in the year 1912, besides invaliding several thousand others. The incidence among children in Texas is comparatively slight, while the sex incidence is similar to other parts of the United States, from three to five women affected to every male adult. The author asks why American women are attacked in greater proportion than European women. He has known a number of cases (three within a week) in which the first definite sign of pellagra developed several days after a surgical operation. As pellagrins are poor subjects for surgery, he wonders whether the disease could be diagnosed earlier by activating the latent skin eruption by means of light, heat or chemical irritation.

In the discussion which followed the reading of this paper, H. L. Moore (Dallas) stated that the disease had been more or less prevalent for 15 or 20 years in a large orphan home; for the last five years it had been diagnosed as pellagra; before that time it used to be called "Red Disease."

F. M. S.

Shropshire (Walter). **Pellagra as a Public Health Problem.**—*Texas State Jl. of Med.* 1913. Aug. Vol. 9. No. 4. pp. 131-133.

The author considers pellagra to be even more dangerous than tuberculosis, because the American has developed some resistive power to the latter; also we know something about its cause and prevention. Since pellagra was discovered in Texas about six years ago, there have been more than 400 official deaths from it, besides many others unreported. The writer considers that it bears a very striking resemblance to trypanosomiasis and he "cannot see how we could for a moment entertain the proposition that maize produces pellagra."

F. M. S.

Grimm (R. M.). **Pellagra: Some Facts in its Epidemiology.**—*Jl. Amer. Med. Assoc.* 1913. May 10. Vol. 60. No. 19. pp. 1423-1427.

This is a condensed report upon field work in 1911-12 in South Carolina, Georgia and Kentucky, which has already been reviewed [see this *Bulletin*, Vol. 1, pp. 686-688.]

F. M. S.

Alessandrini (Giulio), Giannelli (A.), & Fileni (E.). **La Pellagra nella Provincia di Roma.**—*Policlinico.* Sez. prat. 1913. Aug. 24. Vol. 20. No. 34. pp. 1213-1221.

The author and his two colleagues were commissioned in the summer of 1912 to examine pellagra patients in the province of Rome and to study the questions which, directly or indirectly, influence the development of the disease. They found that many people returned as pellagrins did not show the least appearance of the disease. Excepting two endemic foci, one in the north and one in the south, they did not find many pellagrins in the province.

Women were chiefly affected, 35 among a list of 46 certified and doubtful cases. No confirmation of the Simulium theory was discovered. The peasants live chiefly but not exclusively on maize and one typical case of pellagra was met with in a man in easy circumstances who ate good food, but not maize. The authors found no evidence to incriminate maize, but they think that water may have something to do with the cause of the disease. In the endemic foci they found some peasants suffering from pellagra who habitually drank doubtful water, but the province as a whole is supplied with an abundance of water, furnished by many springs.

F. M. S.

Kleiminger. **Neue Beiträge zur Pellagralehre.** [New Contribution to the Study of Pellagra.]—*Zeitschr. f. d. gesamte Neurolog. u. Psychiat.* Orig. 1913. May 31. Vol. 16. No. 5. pp. 586-668.

The author writes from a provincial lunatic asylum in Germany and gives a detailed historical account of the disease followed

by a list of predisposing causes, including heredity. He devotes five pages to the various theories of etiology from Strambio to Sambon. He describes nine of his own cases imported into his asylum, including autopsies of the fatal cases. Most of his patients suffered from katatonia and melancholia. He draws attention to the fact that pellagrous lunatics do not always exhibit the typical symptoms of pellagra as usually described, though all of his cases suffered from dermatitis and enteritis. He believes that the later symptoms, bodily and mental, are due to infection from the intestines. He is a disbeliever in pellagra *sui generis;* "in default of an uniform etiology, we can only speak of a pellagra-symptom-complex." Metabolism is responsible for the predisposition; the nature of the disease is an infectious intestinal catarrh. The erythema is due to intestinal toxins acted on by outside stimuli. Non-specific nervous disturbances are produced as the result of chronic intoxication. Endemic pellagra can only be combated by raising the status of the poorer inhabitants, so that all may have a sufficiency of animal food. The author recommends that the State shall encourage the breeding of cattle and the initiation of fish ponds, while the police should see that none but healthy maize is consumed.

He considers that the spread of pellagra in Germany is unlikely because the people are all well fed.

F. M. S.

Stannus (Hugh S.). **Pellagra in Nyasaland.**—*Ann. Med. Rept. on the Health and Sanitary Condition of the Nyasaland Protectorate for the Year ended* 31*st March,* 1913. pp. 78-86. (London: Printed by Waterlow & Sons, Ltd.).

The author discovered the existence of pellagra in 1910 in the Zomba prison, and during the 12 months ending in March 1913; he has now seen 131 cases among the prisoners, besides others in adjoining villages. He points out the habitual symmetry of the rash, but tells of one patient who sat with his back bared to the sun every day, because he thought it eased his pain, and his whole back became covered with the eruption. He says that some of his cases had to be diagnosed in spite of the complete absence of rash for long periods of time. In such cases he was assisted by the fairly constant presence of non-syphilitic "rhagades" at the angle of the mouth, "consisting of sodden and thickened epithelium with cracks which appear white on the black skin." The affection of the free margin of the prepuce is exactly similar. Epigastric discomfort and pain are very frequent symptoms and one insane pellagrin refused food and had the delusion "that there were flies in his stomach which were biting him." The tongue originally coated, exfoliates, and leaves the tip and sides bright, smooth and shining, devoid of visible papillae. These Nyasaland cases are complicated by ankylostomiasis and bilharziasis of the rectum, but troublesome diarrhoea was also present, apparently due to the pellagra. Cases were seen among the prison warders and native troops, but never among the Indian contingent, numbering 70 Sikhs. Men are more attacked than women. "Men in the Central Prison, Zomba, developed pellagra

who had been under observation in the prison for years, and who had had no maize for years or, in other cases, only in very small amount." The prison ration consists of one and a half pounds of rice daily, with a little salt. The writer draws attention to the well-known habit of pellagrous symptoms to disappear and then to relapse in the following year. He believes that this so-called relapse is possibly a seasonal re-infection or intoxication.

Conclusions: —

"1. Pellagra is endemic in Nyasaland.

"2. The outbreak in the Central Prison has assumed the proportions of an institutional epidemic.

"3. All maize theories of causation, as such, are disproved.

"4. There is some evidence in favour of the disease being caused by an intoxication due to the ingestion of damaged grain, whether it be rice, maize or other.

"5. The theory of an infection carried by Simulium (Sambon) receives very considerable support, and so far in this country there are no facts militating against that theory.

"It is to be carefully noted, however, that the data brought forward equally support the theory which lays the cause of the disease at the door of malnutrition, that is, nutrition wanting in some necessary principle."

[This paper is well worth reading.]

F. M. S.

Box (Charles R.). **Pellagra.**—*Practitioner.* 1913. June. Vol. 90. No. 6. (No. 540.) pp. 940-951.

This paper gives an accurate resumé of the disease, culled from the books and pamphlets of modern writers on pellagra. The author reminds us that maize is not largely used in England as human food. The best known derivative is sold as "corn-flour." Popcorn is torrefied maize and, curiously enough, Dr. Box's two boy patients were fond of it, but they only had the means to buy it occasionally, and it can hardly be suggested that this preference was in any way a cause of the disease.

A maize flour, known as "cones," is sold to bakers, who powder their hands with it when mixing dough—[The best bakers state they use rice flour for dusting their hands and boards]—The author recommends arsenic as the most valuable drug treatment, such as Fowler's solution in doses gradually increased to 20 or 30 minims three times daily.

F. M. S.

Etiology.

Sandwith (F. M.). **Is Pellagra a Disease due to Deficiency of Nutrition?**—*Trans. Soc. Trop. Med. & Hyg.* 1913. April. Vol. 6. No. 5. pp. 143-148.

The author summarises three prominent theories of the etiology of pellagra.

(1) The maize theory initiated by Strambio in 1786.

(2) The photodynamic theory of Raubitschek, an adaptation of the views of Frapolli (1771).

(3) The protozoal theory of Sambon, advanced in 1905.

Bad food as a cause was first suggested at the end of the eighteenth century. The recent developments in connection with

beriberi have caused the author to wonder anew whether pellagra also is not due to deficiency of nutrition. He indicates the points of resemblance between the two diseases. He points out that since 1885 beriberi has been practically eradicated from the Japanese navy by improving the rations. He himself always found that *early* cases of pellagra in Egypt could be cured by admitting them to hospital and giving them an abundant mixed diet, which was distinctly better than that which they obtained in their own homes. Among the products of protein decomposition is the necessary tryptophane $C_{11}H_{12}N_2O_2$. This is present in nearly all proteids, but is shown to be entirely absent from zein, the proteid of maize. He suggests that the inferior maize eaten by peasants in Italy and Egypt "may contain some complex organic body which by virtue of a slight chemical change cannot be used in the normal chain of living processes." He points to the effectiveness of atoxyl, a para salt, and the ineffectiveness of its meta and ortho forms, and to the minute chemical changes which may reduce the efficiency of adrenalin by one half. Ultra violet rays have, he shows, the effect of accelerating most organic chemical reactions. Finally, he refers to the Report of the Pellagra Commission of the State of Illinois, recently published. This Commission concluded that according to the weight of evidence pellagra is a disease due to infection with a living micro-organism of unknown nature, but also stated that deficient animal proteid in the diet may constitute a predisposing factor.

A. G. B.

Jennings (Allan H.) & King (W. V.). **An Intensive Study of Insects as a Possible Etiologic Factor in Pellagra.**—*Amer. Jl. of the Med. Sciences.* 1913. Sept. Vol. 146. No. 3. (No. 498.) pp. 411-440.

This valuable contribution, emanating from the Bureau of Entomology of the U.S. Department of Agriculture in Washington, is the result of the appointment of the authors, early in 1912, by Dr. L. O. Howard, to investigate the possible relation of insects to pellagra. The report deals chiefly with field work from June to October, 1912, with the Thompson-McFadden Pellagra Commission in the Spartanburg County of South Carolina. The population of this County is 83,465, and 28 cotton mills supply the chief industry. The pellagra cases were distributed among the population as follows: mill hands 151, rural 77 and urban 51. The proportion of female to male cases was three to one, which is the approximate ratio of pellagra throughout the United States. The authors find "that a close correlation appears to exist between pellagrous incidence and the amount of time spent in or about the home, and that this holds, not only when the sexes are compared, but within the sexes themselves." Comparison is drawn with two other diseases, chiefly of rural nature, malaria and acute anterior poliomyelitis. The bed-bug (*Cimex lectularius*) was found to be almost always present, and was admitted in 241 out of 256 cases. The human flea (*Pulex irritans*) on the other hand was rarely found and there was no

evidence to incriminate fleas derived from cats, dogs and poultry. It is interesting to note that the fleas with which the only rat examined was infested were *Xenopsylla cheopis*. The mosquitoes chiefly met with were *Culex quinquefasciatus* and *C. restuans*. Six pages, including two good illustrations of breeding places, are devoted to the consideration of Simulium and SAMBON'S "attractive theory" and conclude thus: "The facts as set forth above do not support the incrimination of Simulium in the transmission of pellagra."

The authors agree with those who consider that the essential is not to find that an occasional individual insect might be a potential transmitter of disease, but rather that the group lacks the habits of close association with man, necessary to the establishment of the biologic relation between the vertebrate host, the invertebrate host and the parasite of the disease. They maintain that Simulium is essentially "wild" and therefore not more likely to be dangerous to man than forest mosquitoes in malaria. "The assertion that these flies cause severe epizöotics is certainly not supported as regards America at least." "Species of Simulium are unquestionably found in numbers in large areas of country in which pellagra is rampant, but there is evidence to show that, contrary to Sambon's assumption, the disease is found where Simulium is not." The authors state, on the authority of the Imperial Entomologist of Barbados, that the physical characteristics of that island entirely preclude the existence there of this fly. It is considered that the ubiquitous house fly must continue to be regarded with suspicion.

But it may be seen from the following Summary, which is too valuable not to be reprinted, that the authors still believe that if any insect is responsible it may be Stomoxys.—

"Our investigation was entered upon with no bias in favour of the infectiousness of pellagra or its transmissibility by insects. In the nature of the case, however, and as a basis for our work, it was necessary to assume that both were among the possibilities.

"No preconceptions as to the involvement of any particular insect were indulged, and our conclusions regarding individual species of insects are based upon the epidemiological picture of pellagra, mainly as presented in Spartanburg County, and upon the habits and distribution of the insects as observed by us and as elsewhere recorded.

"Ticks, lice, bed bugs, cockroaches, horseflies, fleas, mosquitoes, buffalo gnats (*Simulium*), house flies, and stable flies (*Stomoxys*) were under consideration. Of these, horse flies have nothing and cockroaches little to support them.

"Ticks and fleas are excluded on account of their scarcity and the nature of their biting habits. In view of these characteristics, it is doubtful if even the existence of an animal reservoir of infection would bring the groups into prominence.

"Lice and bed bugs do not account for the sex or age incidence or the rural nature of the disease; the scarcity of the former is an additional reason for its exclusion.

"The rarity of mosquitoes here and the lack of coincidence between their distribution and that of pellagra for the State in general, together with the night-biting habits of the local species, which fail to account for the sex incidence, seem sufficient cause for their elimination.

"House flies (*Musca domestica*) should be active if the malady is an intestinal infection in which the germ is passed with the feces, with contaminated food acting as the vehicle of infection.

"The buffalo gnats (*Simulium*) should be eliminated, principally by the facts of their biting habits and lack of those of intimate association with

man, also possibly by their comparatively moderate abundance (in our territory). We find that in Spartanburg County they are hardly known as a pest of man and when they do atttack him, it is very locally and largely confined to field workers. Had SAMBON'S theory not been advanced, these flies could hardly have attracted suspicion of any connection with pellagra in this country.

"The stable fly (*Stomoxys calcitrans*) displays certain salient characteristics which seem to qualify it for the role of a transmitter of pellagra.

"The range of this one species covers and exceeds that of pellagra; its seasonal activity, likewise, is coincident with that of the disease and, although its period of greatest abundance is somewhat later than the maximum intensity of pellagra, its appearance in spring precedes that of most of the spring recurrences and new cases, at which time it is already abundant; it is an abundant species, its abundance being most manifest in rural districts thus corresponding with the rural nature of pellagra, its numbers amply fulfilling our conception of those necessary to effective disease transmission; it bites by day only, thereby offering an explanation of the phenomenon of sex incidence and the related one of age distribution; it is intimately associated with man and habitually infests his vicinity and enters his dwellings; it bites men frequently and persistently; its longevity seems sufficient for the development of a hypothetical causative organism; it is readily and frequently carried long distances and might thus account for the occurrence of sporadic cases of the disease."

F. M. S.

ROBERTS (Stewart R.). **The Analogies of Pellagra and the Mosquito.** —*Amer. Jl. of the Med. Sciences.* 1913. Aug. Vol. 146. No. 2. (No. 497.) pp. 233-238.

The first words of this paper, written by the Professor of Medicine of Atlanta, are: "with the publication of SAMBON'S Progress Report, in 1910, the investigation of pellagra really began." He accepts the theory that pellagra is an infectious, insect-borne disease, but advances several objections against the view that the Simulium is the specific insect carrier. He inclines strongly to the belief that pellagra must be conveyed in some similar way to malaria, yellow fever, filariasis and dengue. He states that pellagra is to Italy and Roumania what yellow fever is to the West Indies, and what malaria is to Greece and to the valleys of the Himalayas. He concludes by asserting that in pellagra "the mosquito accounts for its seasonal relations, periodicity and recurrences; its endemic relations, rural habitat, and sporadic appearances in cities; its peculiar geographical situation in Africa, Europe and America; its predominance among females and those who stay much at home; its attack on all ages and both sexes; the spread of the disease in new areas; its first sweep of severity in such areas, and later its gradual decrease and the relative immunity of the inhabitants; its presence along streams and in mosquito-breeding areas.

"Whether a single species of the Culicidae harbors the pellagrous parasite, as in yellow fever, or more than one, as in malaria, and what this particular species may be, is a question for the future. It will probably prove to be a rural breeding, house-living, day-biting mosquito."

F. M. S.

Sambon (L. W.). **The Causation of Pellagra: A Contribution to the Discussion on Dr. Sandwith's Paper.**—*Trans. Soc. Trop. Med. & Hyg.* 1913. May. Vol. 6. No. 6. pp. 231-241.

This paper maintains that the most essential and striking feature of an endemic pellagra zone is the swiftly-flowing stream and that often pellagra and malaria exhibit an inverse distribution. "Pellagra prevails chiefly in the highlands trenched by running streams; malaria prevails in the swampy lowlands." Attention is drawn to the axiom that no spot can be a true pellagra station unless the disease is found to occur in very young children who have never left it. Mention is made of three Italian infants who were attacked between the ages of three and five months and were seen by the author. He believes that even strong, healthy people are liable to contract pellagra soon after they begin to reside in a pellagrous locality and he holds very strongly that the topographical distribution is decidely opposed to such explanations as the deficiency of nutrition or maize-mould or the photo-dynamic theory. He mentions, but does not explain, the interesting fact that patients removed from their homes to an asylum often get a recurrence of dermatitis during the spring months, in spite of a complete change of their diet and general habits. He also wishes to make it clear that he does not now limit his theory that pellagra is insect-borne to the family *Simuliidae*, but is "inclined to extend the number of possible carriers and include certain blood-sucking midges, such as *Leptoconops*, for instance, which are now placed in the family *Chironomidae*."

F. M. S.

Perroncito (Aldo). **Relazione sul tema: Eziologia della Pellagra.** [Etiology of Pellagra.] — *Sperimentale.* 1913. Sept. 5. Vol. 67. Suppl. to No. 4. (Atti dell' viii Riunione della Soc. Italiana di Patologia tenuta in Pisa nei giorni 25, 26, 27 Marzo 1913.) pp. 94-139. [With Discussion pp. 139-142.]

The author gives a long historical resumé of the three theories as to the causation of pellagra—maize, toxic maize, and parasites. He sums up by pleading that all the splendid work which has been done in Italy to fight poverty and prematurely grown or diseased maize should not be discontinued, though he confesses that the etiological problem is still unsolved.

The theory of insufficient nutrition finds no favour with him, because in times of famine pellagra may be absent, and on the other hand it is sometimes met with among the affluent.

He recapitulates Lombroso's experiments, and says that although he did not prove that pellagra is caused by diseased maize, he did succeed in introducing an important number of humanitarian laws, and he established the fact that diseased maize is a dangerous diet. Among those who have advanced parasitic theories he specially mentions Ceni, Tizzoni, Sambon and Alessandrini. He states that Ceni's experiments have not been confirmed by others and he considers it a very weak point

in his theory that the spores of various Aspergilli were able to migrate into the internal organs of animals without developing, though the experimenter suggested that they there set up changes of a toxic character. Tizzoni's polymorphic streptobacillus could not be found by the author in a score of pellagrins and others have also failed to find it. Sambon's views are quoted at length and praise is given to him for disregarding the validity of Italian statistics, but he considers that it is unscientific for Sambon to have absolutely settled upon the insect carrier, before we know anything about the parasite, or even if there be a parasite. Alessandrini's filaria and drinking water theory meets with no approval. He does not reject the possibility of pellagra some day being proved to be a protozoal disease and cites the success of atoxyl treatment as an argument in favour of this view.

F. M. S.

Tizzoni (G.) & de Angelis (G.). **Studien über die Biologie und die Morphologie des pleomorphen Streptobacillus der Pellagra.** [The Biology and Morphology of the Pleomorphic Streptobacillus of Pellagra.]—*Centralbl. f. Bakt.* 1. Abt., Orig. 1913. May 3. Vol. 69. No. 1/2. pp. 5-8.

This is a paper in continuation of one on the same subject reviewed in this *Bulletin*, Vol. 1, p. 681. The authors now maintain, as they did before, that Type A of their streptobacillus can pass into Type B. They still believe from its morphological characters that their organism should be classed in the group of Actinomyces. They consider that their researches throw light upon the difficult question of how pellagra may be evolved from diseased maize.

F. M. S.

Tizzoni (Guido) & de Angelis (Giovanni). i. **Ueber den Entwickelungszyklus des pleomorphen Streptobacillus der Pellagra.** [On the Developmental Cycle of the Pleomorphic Streptobacillus of Pellagra.]—*Centralbl. f. Bakt.* 1. Abt., Orig. 1913. July 29. Vol. 70. No. 1/2. pp. 24-29.

ii. **Sul Ciclo Evolutivo dello Streptobacillo della Pellagra.**—*Pathologica.* 1913. Apr. 15. Vol. 5. No. 107. pp. 225-228.

These two papers are identical and consist of a second communication on the cycle of development of the streptobacillus believed by the authors to be the cause of pellagra. They claim that their bacillus can be isolated from the blood, cerebro-spinal fluid and internal organs of acute fulminating cases, and also from the blood and faeces of ordinary cases during a period of recrudescence, as well as from diseased maize.

The presence of the numbers found during life, their elective localization in the central nervous system, experiments with serum on pellagrins and observations on guinea-pigs and monkeys, all contribute to their belief that the true cause of pellagra has been discovered.

Their researches in the laboratory at Bologna convince them that the streptobacillus may exist in three perfectly distinct phases of development, according to the conditions of the nutritive media: (1) the lower or adaptive, (2) the intermediate or actinomycetic, (3) the higher or hyphomycetic.

The authors claim that "no one can fail to see the importance of these results, from which it is certain that the pleomorphic bacillus, obtained from the blood and faeces of pellagrins, is in its various types nothing more than an adaptive form of a parasite, which, in the higher stages of its development, must be included among the higher hyphomycetes."

F. M. S.

Alessandrini (G.) & Scala (A.). **Contributo nuovo alla Etiologia e Patogenesi della Pellagra.**—*Policlinico.* Sez. pratica. 1913. June 8. Vol. 20. No. 23. pp. 805-812.

The two Roman professors have apparently relinquished the filarial theory and now consider that pellagra is strictly limited to those districts where the drinking water comes from a clay soil and that the chronic intoxication is caused by silica in colloidal solution in certain waters. They ingeniously suggest that rain water passing over clay or aluminium silicate causes hydrolysis, with the formation of aluminium hydrate and silicic acid. These in the colloid state, being incompatible, precipitate one another, leaving an excess of silicic acid in the water. The first effect of this solution of colloidal silica upon animals is a retention of sodium chloride.

The colloidal silica combines with the salt and transfers it to the proteid molecule where a new reaction takes place by hydrolysis, producing an unstable compound which splits off hydrochloric acid, thus occasioning a mineral acidosis which is considered responsible for many pellagrous symptoms.

Experiments were made with a solution of colloidal silica, derived from the water of a pellagra zone, introduced into food and also intraperitoneally and subcutaneously into rabbits, guinea-pigs, dogs and monkeys. [The number of animals used is not given]. The symptoms produced were diarrhoea, excitement followed by nervous depression, and, in the worst cases, spastic paralysis, retention of urine, loss of weight and death with convulsions. The most notable post-mortem appearances were erythema, distended stomach, hyperaemia of most organs and transparent distended intestines, with haemorrhagic spots in the colon. The authors argued that an acidosis ought to be cured by an alkali and they therefore injected into one of their infected dogs, a solution of tri-sodic citrate 5 per cent., after which the animal regained its health and after 16 days excreted normal urine.

They then subjected nine pellagrins to similar daily injections beginning with 5 per cent. and continuing with 10 per cent. They chose individuals who had lately shown very decided symptoms of pellagra, and allowed them to continue living in

their homes, with their accustomed food and work. The patients reported that their digestive disturbance became less, appetite and strength increased, and their weight also. [No details of weight given.]

F. M. S.

Clinical and Treatment.

Box (Charles R.). **Fatal Pellagra in two English Boys.**—*Trans. Soc. Trop. Med. & Hyg.* 1913. Apr. Vol. 6. No. 5. pp. 149-156: and *Brit. Med. Jl.* 1913. July 5. pp. 2-4. With 1 coloured plate.

An English boy aged 8, who had lived always in the neighbourhood of London, was admitted to St. Thomas's Hospital in September 1912, at his parents' request, because they feared that he was developing an obscure nervous disease similar to one to which another child had already succumbed.

The patient was thin and had suffered for three months before admission from odd seizures during which his body became rigid and head was stiffly retracted, but consciousness was not lost. His gait showed a mixture of spasm and ataxy, a coarse nystagmus was always present, all the deep reflexes of his limbs were increased, tenderness was elicited by firm pressure near the upper dorsal vertebrae, and he suffered from incontinence of both urine and faeces. The tip and edges of the tongue were slightly denuded of epithelium and there was an inflammatory condition of the skin around the anus. A typical pellagrous symmetrical rash was present on the backs of the hands and wrists, the orbital regions and bridge of the nose, the nape of the neck and backs of the ears and over the olecranon processes. The rash had a bright red appearance, which in hospital gradually became brownish. Box diagnosed the case from its resemblance to pictures in books and the rash is well shown in an accompanying sketch by Terzi. The patient died four weeks after admission and developed slight mental delusions during the last days of his life. At the post-mortem examination no gross changes of importance were seen. The small intestine contained much mucus and the edges of the ileo-caecal valve were purple and superficially ulcerated. A culture made from the blood immediately after death showed the presence of *Streptococcus pyogenes*. Box is now certain that the other child who was an in-patient at St. Thomas's Hospital for a fortnight in September and October 1910 and who died at home in January 1911 was also a case of pellagra. This diagnosis was not considered at the time and it was thought that the boy was suffering from an anomalous form of combined degeneration of the cord in some respects resembling Friedreich's ataxy. The mother now says that this boy also had a rash, which was present only in the summer and occurred during the last three or four years of life. This earlier case was born in Ireland but had always lived, since infancy, in the vicinity of London.

F. M. S.

Hammond (J. A. B.). **A Case of Pellagra in England, probably contracted in Scotland.**—*Brit. Med. Jl.* 1913. July 5. p. 12.

The symptoms, not usually seen in pellagra, which require explanation are: coated tongue, abdominal pain, tenderness, and a slight evening temperature which all disappeared after the appendix was removed; a second phase of acute abdominal pain, accompanied this time by offensive stools, mucus and profuse haemorrhage, all of which yielded to vaccine treatment; a dermatitis which became suppurative about the lips and between the fingers; ulceration of the tongue and mouth; a return of abdominal pain and tenderness, "worse just before and after the bowels acted," necessitating laparotomy. The points in favour of the diagnosis of pellagra are: dermatitis of face, wrists and hands occurring in the second spring of the illness, heartburn, emaciation, exaggerated knee jerks and some mental confusion before death. Permission was only obtained to examine the abdomen after death and this threw no light upon the diagnosis. [The author's reasons for supposing that this was "undoubtedly" a case of pellagra are not very apparent. The patient was under observation for two years until her death in the Isle of Wight, but during that time she does not seem to have been seen by any physician acquainted with pellagra.]

F. M. S.

Sambon (Louis W.). i. **The Natural History of Pellagra. With an Account of Two New Cases in England.**—*Brit. Med. Jl.* 1913. July 5. pp. 5-12.

ii. **Pellagra in Great Britain: Three New Indigenous Cases.**—*Ibid.* July 19. pp. 119-120. With illustrations.

iii. **Pellagra in Great Britain. Notes of some Further Cases.**—*Ibid.* Aug. 9. pp. 297-298.

i. The first case mentioned is that of Dr. Box, "the first indubitable case recognized in England." The second is a kitchen gardener of Lymington who has never been out of Hampshire; he suffered from a symmetrical summer rash, vertigo, tremor of hands, depression of spirits, bodily weakness and diarrhoea. He stated that he had sometimes in the evenings been bitten by small black flies while gardening. The author visited the Lymington river and many of its tributary streams and found in all of them larvae and pupae of *Simuliidae*. His assistant also found similar larvae and pupae in streams near the house where Box's patient lived. The author visited this house and was rewarded by finding a third boy of the same family who had a slight rash but no other symptoms of pellagra. This first paper is enriched by a description of Simulium and by drawings of the insect larva and pupa.

ii. The second paper describes (1) the fatal case of a child in Shropshire and the existence of small swarms of Simulium near a brook where the child had frequently played; (2) the reported case of a woman from Cardiganshire; (3) Blandy's fatal case in the Napsburg Lunatic Asylum.

"With regard to the etiology of pellagra, the British cases absolutely disprove the maize theory of its causation."

iii. The third paper describes two cases at the Prestwich County Asylum, both women, and another woman from Walthamstow which was posthumously diagnosed by Dr. Raymond Crawford, who had treated her at King's College Hospital in 1912-1913.

[It is earnestly to be hoped that medical officers of lunatic asylums and also practitioners in rural districts will keep a sharp look out for possible cases.]

F. M. S.

Blandy (Gurth S.). **A Contribution to the Study of Pellagra in England.**—*Lancet.* 1913. Sept. 6. pp. 713-717. With 2 plates.

This paper, by the Assistant Medical Officer of the Middlesex County Asylum, suggests that pellagra is not so rare a disease in English lunatic asylums as has been supposed. Three of the eleven cases briefly described were visited by Dr. Sambon who confirmed the diagnosis of pellagra, while eight others have been brought forward from past or present records of the Asylum. This is similar to the early history of the disease in the United States, for after the diagnosis of the early insane patients, many former cases of obscurity were resuscitated and thought to be undoubted instances of pellagra undiagnosed during life.

Case 1, who had never lived far from London, developed in June 1913, a month after her admission, dermatitis of face, wrists and dorsal aspects of hands and fingers; it was noted that the terminal phalanges were less affected than the rest of the hands. She died on July 29th after being in an afebrile "typhoid state" for three weeks. The results of the pathological investigation by an expert will be published later. This patient "was not out in the open at any time while in this hospital, but was on one occasion only under a verandah which was protected from the sun."

The plates accompanying the article show twelve photographs from four cases, the skin lesions depicted looking exactly like the well-known pellagra eruption.

Case 7 was admitted when she was 37 years old and had already been insane for 20 years. In the summer of 1909, about eighteen months after admission, she developed dermatitis of the hands (called sunburn), stomatitis, diarrhoea and increased mental excitement, followed later by causeless vomiting and emaciation. Eventually there were noted albuminuria, subnormal temperature and increasing feebleness till death on November 17th, 1912.

"At the post-mortem examination very marked chronic nephritis, some pulmonary infarcts and a small, evidently terminal, empyema were found."

Of the eleven cases ten were females, the remaining one being a doubtful case of a male who died suddenly and was found post mortem to have had pulmonary tuberculosis. All the patients, except one, were adults, aged from 20-40 years.

"A very striking feature of the cases described in this article is their severity." This is another similarity with the early

American cases, for in Egypt and Italy it is rare to meet with fulminating cases.

[This paper is well worth perusal. Case 11 became rapidly worse and died on September 15th, 1913.]

F. M. S.

Cole (J. W. E.). **Notes of a Case of Pellagra.**—*Lancet.* 1913. Sept. 6. pp. 717-718.

This is a case reported from the Bethnall House lunatic asylum in London, which was visited by Sambon and Sturli of Trieste who corroborated the diagnosis. A somewhat symmetrical rash on the face, neck, hands and wrists, followed by desquamation, diarrhoea, exaggerated knee jerks and skin reflexes, were the symptoms present. Mentally a condition resembling katatoniac stupor existed.

F. M. S.

Deeks (W. E.). **Pellagra in the Canal Zone: Its Etiology and Treatment.**—*Southern Med. Jl.* 1913. July 1. Vol. 6. No. 7. pp. 438-446.

This is a report of 30 cases treated in Ancon Hospital, including the progress of 12 cases previously recorded.

Gastro-intestinal symptoms were present in 77 and dermatitis in 83 per cent. Evidence of nephritis existed in 83 per cent.; "some showed chronic changes, others those of acute conditions which rapidly subsided on treatment." The author repeats his former belief that pellagra "is the result of an auto-intoxication caused by the action of some ferment or organism on a carbohydrate diet to excess, to the exclusion of green vegetables and fruits during the warm weather when metabolic activity is lessened."

He asserts that "there is no endemic center." [This unusual assertion arises apparently from the fact that most of his patients came from different islands, Martinique, Guadeloupe, Trinidad, Jamaica, Barbados, Montserrat and St. Lucia.] He considers that maize, when consumed largely, is probably an important factor, but when taken sparingly it is of no more importance than any other starchy food. He believes that the increase of pellagra is partly due to the inordinate consumption of cane sugar in all civilized countries, for instance in the United States, of 3·28 ounces daily per head, and that pellagra is the result of auto-intoxication. His treatment is to avoid sugar and starchy food in every form, to limit the diet of pellagrins to fresh fruit juice, preferably orange, with broths and milk, and after a few days, to a carbohydrate-free regimen. He has also great faith in dilute nitric acid, 15 to 30 drops in three quarters of a tumbler of water three times a day before meals.

F. M. S.

VON PROBIZER (Guido). **Praktische Bemerkungen zur Diagnose der pellagrösen Hautveränderungen.** [Practical Notes on the Diagnosis of Skin Lesions in Pellagra.]—*Dermatol. Wochenschrift.* 1913. June 7. Vol. 56. No. 23. pp. 637-649. With 1 plate.

The author writes from a pellagra asylum in the Austrian Tyrol and agrees with LOMBROSO that the skin manifestations of pellagra are not the most important symptoms of the disease. In other words, the presence of erythema is of great use in diagnosing a doubtful case, but its absence does not justify one in regarding a case as not pellagrous. His asylum has since the beginning of this century been able to furnish clinical material to the psychiatric and dermatological clinics of Innsbrück, in the latter of which Professor MERK prepared his well-known casts.

Unable to accept the optimistic statement of LUSSANA, that the fight against pellagra will soon fail in its objective, because the material for further study will be lacking, the author recognizes that the mass of material with which he had to deal ten years ago at Trentino can no longer be found, and that pellagra is now assuming a modified form with partial disappearance of the skin lesions. He pleads for a more thorough histological and pathological study of the skin lesions and points out that the country doctor has now great difficulty in diagnosing between pellagrous erythema and other forms of erythema on the back of the hands said to be due to the sun or to alcohol, which occur in a district where pellagra is endemic. He quotes at length the discussion at the Bergamo pellagra congress and the opinions of the Venetian dermatologist, Professor FIOCCO. The plate shows the dorsal regions of the hands of a patient.

F. M. S.

BARDIN (James C.). **Further Observations on the Blood of Pellagra.** —*Amer. Jl. of Insanity.* 1913. July. Vol. 70. No. 1. pp. 155-159.

The author having already published observations made on fourteen cases of pellagra, this is the result of the study of seven additional cases in negroes of Virginia. The author finds that he can by blood examination discriminate between (1) uncomplicated pellagra, (2) pellagra associated with tuberculosis, and (3) pellagra complicated by intestinal parasites, such as Ascaris, Tricocephalus and *Strongyloides intestinalis.*

Two slides were examined at each of four counts and at least 600 corpuscles were averaged. In (1) polymorphonuclears were reduced, small and large lymphocytes increased, eosinophiles normal. In (2) polymorphonuclears somewhat increased, small lymphocytes somewhat reduced, large lymphocytes slightly increased, eosinophiles normal. In (3) polymorphonuclears much reduced, small and large lymphocytes increased, eosinophiles greatly increased. It is believed that the small lymphocytes increase in proportion to the severity of the skin lesions.

[No percentages are given.]

F. M. S.

Niles (George M.). **The Role of Hydrotherapy in the Treatment of Pellagra.**—*Amer. Jl. of the Med. Sciences.* 1913. Aug. Vol. 146. No. 2. (No. 497.) pp. 230-233.

The author, who is Professor of Gastro-enterology and Therapeutics in Atlanta (Georgia), after an experience of 75 cases, claims that energetic hydrotherapy should be employed in addition to other methods of treatment. He recommends for nausea the drinking of two to six glasses of tepid water daily, unless lavage can be performed by an expert. The frequent diarrhoea may be greatly alleviated by hot colon irrigations, followed by cold sitz baths for five to ten minutes; this double method may be repeated two to four times daily when the patient is not too weak. Cold abdominal compresses, various hot packs, saline baths, "revulsive compresses to the spine," cold percussion spinal douche baths, beginning with a temperature varying from 45° to 70°, all are praised. "Cold packs are seldom indicated, though in some 'typhoid' cases, with muttering delirium, they hold a doubtful place."

[General and local saline baths have been used for many years in some hospitals in Italy. They give temporary relief.]

F. M. S.

Kelly (D. W.). **A Case of Pellagra treated with Salvarsan.**—*New Orleans Med. & Surg. Jl.* 1913. Aug. Vol. 66. No. 2. pp. 106-107.

A young white woman of Louisiana began to suffer from vomiting in the autumn of 1910 and a year later developed mental symptoms. In April, 1912, she showed for the first time the "skin lesions of pellagra" and two months afterwards she applied to the author for treatment. She was then "ravingly insane and nothing but skin and bones, weighing about 75 pounds." He gave her intravenously three grains of salvarsan and increased the dose every 10 or 15 days until he had given a fifth dose of nine grains seven weeks from the beginning of the treatment. She began to gain weight and show a general improvement from the very first dose, and the author states that in the autumn her mind was "perfectly restored" and she weighed about 175 pounds. For diet she was not allowed maize products and was given as much milk and eggs as possible.

F. M. S.

Shoemaker (Harlan). **Pellagra, Surgery, The Colloids and Strong Drugs. Also Introducing a Possible New Etiological Factor.**—*New York Med. Jl.* 1913. Aug. 2. Vol. 98. No. 5. pp. 214-219.

The writer says that in the year 1910 there were known to him only about ten cases of pellagra in Cleveland County, North Carolina; in 1912, there were 100 cases and in 1913 the incidence "is almost that of measles." Early surgery is now recommended. "I have deliberately opened the upper abdomen in two early cases of pellagra for the purpose of draining the gall bladder,

and I was fortunately able to remove the appendix through this high incision." Both patients were discharged from the hospital on the 21st day. One had an uneventful recovery, the other, a woman, became pregnant and nearly died "from recurring intestinal symptoms" followed by abortion.

The author's experience is that for the first six to nine months pellagra "remains as a mild catarrhal indigestion confined to the upper abdomen." Because the gall bladder is sometimes a reservoir for microbes, he considers it possible that the pellagra germ may lurk there. "Gall bladder drainage is the operation of election, because it is as high in the alimentary tract as it is necessary to drain, and, being an operation of election, should be accompanied by an appendectomy." He goes so far as to state that "one in twelve pellagrins are surgical and can be treated by drainage." According to him, all authors agree that pellagra is a disease of hypoleucocytosis, and therefore he argues that artificial leucocytosis should be produced by a surgical operation, or by administering colloids intravenously. He is, however, aware of the danger of alcohol, morphia and pregnancy.

F. M. S.

Law (William Lamar). **Treatment of Pellagra with Lactic Acid Bacilli.**—*Jl. Amer. Med. Assoc.* 1913. July 5. Vol. 61. No. 1. p. 27.

This is a commendably short paper of six lines, in which the writer states that he has treated his last five cases of pellagra with tablets of lactic acid bacilli, followed by an improvement in their subjective symptoms.

F. M. S.

Experimental and Pathology.

Harris (William H.). **The Experimental Production of Pellagra in the Monkey by a Berkefeld Filtrate derived from Human Lesions. A Preliminary Note.**—*Jl. Amer. Med. Assoc.* 1913. June 21. Vol. 60. No. 25. pp. 1948-1950. With 2 figs.

In the spring of 1910 an autopsy was made on an uncomplicated case of pellagra, two hours after death. Portions of the spinal cord, skin and digestive tract were mixed with equal amounts of normal saline solution, ground together in a mortar and after coarse filtration the juice was passed through a Berkefeld filter, letter N. The filtrate was then injected subcutaneously and intracranially, in large quantities into a healthy monkey (*Macacus rhesus*), which remained "normal for many months" and then developed irregular dark patches on the face, forearms, hands, back and sides of the body. The monkey gradually grew thin and weak and died. Post mortem were found some inflammation of the small intestine and, microscopically, "extensive hyperkeratoses of the epidermis, marked increase in the depth of the papillae and abundant pigmentation in the deeper portions of the corium where many chromatophores have wandered into the deeper strata." [The monkey's spinal cord was apparently not examined.] Sceptics did not accept this

as a case of monkey pellagra, so it was determined to wait until a similar typical and uncomplicated fatal human case should be available. On December 2, 1912, a similar monkey was inoculated as above, and this second monkey remained apparently normal for two months. On February 12, 1913, Monkey 2 was given a second injection from the brain, spinal cord, intestinal and skin lesions, obtained direct from a human autopsy of pellagra. Early in May, Monkey 2 showed irregular patches of a copper or dusky red colour about the face, and the patches gradually became somewhat butterfly-shaped. Later symmetrical copper coloured lesions appeared on the summit of the concha of both ears and at the external canthus of the eyes and also over the backs of the hands. The monkey became melancholic, emaciated and weak, with diminished appetite, diarrhoea, salivation and granular tip of the tongue. On June 1, when the author wrote his paper from the Laboratories of Tulane University, Monkey 2 was evidently dying. Also on February 12, 1913, Monkey 3 was injected intravenously and intracranially with filtrate prepared from the brain and cord of the human case. On June 1, "Monkey 3 is still in good condition and quite lively but presents about the face a few irregular, rust-coloured macules, quite like the early lesions of Monkey 2." [The two illustrations are of Monkey 2, and are suggestive of pellagra. We cannot draw any conclusions, until a larger number of animals have been inoculated. The introduction of pellagra in this way into monkeys, if accepted, will be the strongest argument yet advanced that pellagra is a protozoal disease.]

F. M. S.

Dearman (W. A.). **Pellagra induced in a Monkey. Preliminary Report.**—*Mississippi Med. Monthly.* 1913. Mar. Vol. 17. No. 11. pp. 220-221.

The author states that he has induced "a typical case of pellagra in a monkey" and he seems to have exhibited the sick monkey to the Harrison County Medical Society. The animal is said to have suffered from diarrhoea, emaciation and desquamation of dorsum of hands, lower part of forearms, elbows and root of the tail. [Dr. Harris's experiments are being imitated by many in the United States. This paper can hardly be taken seriously for the author does not tell us what he did nor when he he did it.]

F. M. S.

Nicholls (Lucius). **The Pathological Changes in Pellagra and the Production of the Disease in Lower Animals.**—*Jl. of Hygiene.* 1913. July. Vol. 13. No. 2. pp. 149-161. With 2 plates.

The microscopical sections, illustrated by the plates, were made in the Quick Laboratory, Cambridge, but the rest of the work was done in St. Lucia. An analysis is given of eight autopsies of mulatto pellagrins, all of whom had suffered during life from

typical eruptions, emaciation, irritable dementia, soreness of mouth and persistent diarrhoea. There were found, some atrophy of heart; fatty degeneration of liver with shrinkage of weight to an average of 37 and a half ounces; shrinkage of spleen to an average weight of three ounces (one case seven drachms), which is the more important because the patients had all come from malarial localities; thinning of walls of stomach and intestines; atrophy of the stratum corneum of skin. "In some cases the dura mater was thickened, and the pia mater showed irregular areas due to thickening. The convolutions of the brain were atrophied, and were of firmer consistence than normal . . . . There was an increase in the fibrous tissue in the meninges and the arterioles supplying them were thickened, also the endothelium of the capillary vessels showed degeneration with a tendency to proliferation. The cortical cells of the brain were shrunken and degenerate." The author considers that the pathological changes are greatly due to degeneration of the capillaries, giving rise to stenosis and blood stasis, and consequent leakage from the weakened vessels. He suggests that the eruption on exposed skin surfaces is caused by the solar radiation and possibly other factors accentuating the damage which has taken place in the vascular supply. With regard to the sand-fly protozoal hypothesis he states that the evidence of Sambon and Chalmers "in support of the theory is of a very frail nature."

He is of opinion that previous experimenters on animals and poultry have expected too much in hoping to reproduce "the exact picture or all the signs and symptoms which occur in man. If, however, it can be shown that a certain organism or a material produces an analogous condition leading to the death of the animal, and the post-mortem and microscopical examination show similar changes, evidence of the cause of the disease in man is afforded."

He experimented upon six rats by giving them in their food "various preparations of decomposing corn-meal"; three died between the 8th and 31st day, two were killed on the 34th day, and the sixth escaped. Four control animals remained healthy. Four of the five dead rats showed fatty degeneration of liver and numerous haemorrhages among the liver cells, also an increase in the fibrous tissue of the spleen, numerous haemorrhages and a degree of pigmentation of spleen "which exactly compared with that which is seen in sections from human subjects who have died of pellagra."

Though the advanced arteriole thickening and extreme atrophy and cellular degeneration of chronic human cases were absent in the rats, the author is of opinion that "these preliminary experiments show that corn-meal acted upon by various micro-organisms develops toxins which may produce in animals a condition analogous to pellagra in man." [These experiments are too few in number to prove much. It is not clear what food the control rats were given.]

F. M. S.

Mott (F. W.). **The Histological Changes in the Nervous System of Dr. Box's Case of Pellagra, compared with Changes found in a Case of Pellagra dying in the Abassieh Asylum, Cairo.**—*Trans. Soc. Trop. Med. & Hyg.* 1913. Apr. Vol. 6. No. 3. pp. 157-160. With 12 figs: and *Brit. Med. Jl.* 1913. July 5. pp. 4-5. With 3 plates.

This paper, like that of Dr. Box, was read before the Society of Tropical Medicine and Hygiene in February, 1913. It deals with the case of the patient diagnosed during life by Dr. Box and is accompanied by photomicrographs of the sciatic nerve, spinal cord and cerebellum. The material sent to the author for examination consisted of the brain, spinal cord, a few of the posterior spinal ganglia and a piece of the sciatic nerve. The Marchi method showed the following changes in the fibres: recent scattered degenerative fibres in all the longitudinal and transverse sections of the sciatic nerve, similar changes in the roots of the *cauda equina* and throughout the white matter of the spinal cord, more marked in the postero-lateral and posterior median columns than elsewhere. The Weigert-Pal method displayed general diffuse sclerosis throughout the white matter of the cord everywhere, while the naked eye could see sclerosis affecting the direct cerebellar and Gowers's tracts, Goll's column and the crossed pyramidal tracts. Descending degeneration could be seen in the lower lumbar and sacral regions. Some scattered sclerosis was also observed in the pyramids of the medulla. In none of the sections made was there evidence of meningeal or peri-vascular infiltration with lymphocytes or plasma cells or with polynuclear leucocytes. "The absence of chronic meningo-encephalitis and meningo-myelitis, so characteristic of protozoal diseases, contraindicates the protozoal theory of the origin of pellagra, yet it does not disprove it, for in malaria the vessels may be filled with the organisms and yet no inflammatory peri-vascular and meningeal reaction is seen; moreover, although all the changes are like those produced by a chronic toxaemia, yet the cause of that toxaemia has not been satisfactorily determined."

Varying degrees of chromatolysis were seen, with swelling of the cells, disappearance of the Nissl granules, except at the periphery, and frequently eccentric position of the nucleus. Comparison of the changes in the cells with those of the Cairo lunatic, who died from pellagra in the asylum, showed no essential difference. "There is a combined sclerosis of the spinal cord more marked in the Egyptian case; there are the same changes in all the ganglion cells of the spinal cord and brain and there are no signs of acute or chronic vascular or meningeal inflammatory changes." [This report is a model which should be read and imitated by all those who have the opportunity of conducting autopsies upon the pellagrous in well-equipped hospitals.]

F. M. S.

Centanni (E.) & Galassi (C.). **Sul Doppio Effetto, Tossico e Unilaterale, dell' Alimentazione Maidica.** [On the Double Action, Toxic and One-sided, of Maize Food.] — *Sperimentale.* 1913. Sept. 5. Vol. 67. Suppl. to No. 4. (Atti dell' viii Riunione d. Soc. Italiana di Patologia tenuta in Pisa nei giorni 25, 26, 27 Marzo, 1913.) pp. 142-150.

Recent chemical researches with reference to beriberi and scurvy stimulated the authors in the Institute at Siena to experiment on the nutritive value of maize. They found that three guinea-pigs fed on maize in artificial darkness died in 14 to 29 days, after loss of weight, failure of appetite, diarrhoea, hair falling off, with a little redness, oedema and desquamation of the skin of the feet. After death there was seen congestion of the gastro-intestinal tract and in one of the stomachs there was a clot of blood.

Three other guinea-pigs kept similarly but fed also on vegetables during 51 to 75 days gained in weight and health and showed no skin affection. In the second experiment three guinea-pigs were fed upon maize extract, treated by ether or alcohol, and were exposed to light and for part of the day to the sun. All died in from six to ten days, after refusing to eat. Two other guinea-pigs treated in the same way but given vegetables in addition lived for 40 days in the best possible health; they were then gradually deprived of their vegetable ration and succumbed 23 and 25 days after it was stopped. At the autopsy of one of them were seen typical signs of experimental scurvy, as described by Holst and Frölich, looseness of teeth, haemorrhages in intestines and pancreas and changes between the shafts and epiphyses of femurs and ribs.

Other experiments were tried on rats which stood the exclusive diet less well than guinea-pigs. The authors consider that in maize nutrition the factor of exclusive (one sided) diet is of greater importance than the photo-dynamic factor.

F. M. S.

Cassamalli (Ferdinando). **Sulla Persistenza del Potere Vitale di Spore Eumicetiche, esposte ad Alta Temperatura.** [Persistence of Vitality of Certain Spores of Mould, after Exposure to a High Temperature.]—*Riv. Pellagrologica Italiana.* 1913. July. Vol. 13. No. 4. pp. 51-54.

A note from the laboratories of Reggio Emilia. The author finds that the heat to which maize flour is subjected in making *polenta* does not kill the spores of certain moulds which are apt to pollute the flour eaten by pellagrous people. The *Aspergillus fumigatus* has a greater resistive power to heat than some varieties of *Penicillum.*

[There is nothing new in this, for it was maintained years ago by Ceni.]

F. M. S.

Finata (L.) & Novello (F.). **Richerche sulla Ipersensibilità dei Pellagrosi.**—*Pathologica.* 1913. Aug. 15. Vol. 5. No. 115. pp. 492-493.

A note from Verona on the reaction seen in pellagrins after the intramuscular injection of sterile extracts of damaged maize.

Some pellagrogenin* having been procured from Professor Volpino, 41 pellagrins each received one intramuscular injection in the buttock. A positive reaction took place in 31, negative in nine and doubtful in one case. An intense reaction was only seen in those who had recently been admitted to the sanatorium and was chiefly confined to the nervous system. The authors consider that four of their cases also showed an increase of erythema. They maintain that eighteen healthy people similarly injected showed no reaction and [on these very slender results] they state that pellagrins have really this hypersensibility.

F. M. S.

Thomas (W. Rees). **Pellagra and Drug Intoxication.** [Correspondence.]—*Lancet.* 1913. Sept. 13. p. 842.

This writer, from the East Sussex Asylum, is surprised to hear that most cases of pellagra in England are lunatics in asylums. But in the United States the early patients were chiefly discovered in such institutions, and even in Italy to-day a visitor is more likely to be shown pellagrous cases in an asylum than in a general hospital. He suggests that sulphonal or trional may produce a symmetrical rash, resembling pellagra, accompanied by diarrhoea and emaciation.

[It is to be hoped that he will now publish photographs or sketches of these drug rashes, which, from his description, are evidently somewhat different to the scarlatiniform eruption or generalised erythema which are well known to betray sulphonal poisoning. He does not state whether haematoporphyrinuria was present in his cases.]

F. M. S.

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* See *Pathologica.* 1913. Mar. 15. Vol. 5. No. 105. pp. 174–176.

LEPROSY.

History.

Morrow (Robert). **History of Leprosy in South Africa up to the Establishment of the First Leper Asylum, Hemel en Aarde.**—*S. African Med. Rec.* 1913. May 24. Vol. 11. No. 10. pp. 174-183.

The Bushmen, a race of pigmies, inhabited Africa south of the Zambesi for 25 centuries, for so the erosion of the igneous rocks on which their drawings were executed would testify. They were a nomad people existing on ant-eggs, roots, and the produce of the chase. It is probable that leprosy was endemic among them. The extensive ruins of Zimbabwe and the old gold-workings scattered throughout southern Rhodesia indicate that there was a large foreign population at one time, by which also the infection might have been introduced. In the 15th century the Bushmen were invaded by the Hottentots, and afterwards by the warlike Bantus. Soon after the advent of the European in the 17th century their extermination was completed. Both Hottentots and Bantus were of leprous stock in all probability.

The first authentic record of leprosy occurs in the Archives of the Cape of Good Hope in the year 1756. The presence of leprosy in European families was then reported officially. At the beginning of the 19th century the disease was rife, especially among the Hottentots. In 1817 a leper asylum, Hemel en Aarde [Heaven on Earth], was established, and accommodated 100 natives who were placed under no restrictions. It was situated in Caledon, and thither all the lepers of the colony were transferred.

C. Birt.

Keussen (Herm.). **Beiträge zur Geschichte der Kölner Lepra-Untersuchungen.** [The History of Leprosy Inspections in Cologne.]—*Lepra.* 1913. July. Vol. 14. No. 2. pp. 80-112.

Short clinical notes are given of 178 persons who were examined for leprosy by the Faculty of Medicine of Cologne in the years 1491-1664. Biographical accounts of the Members of the Faculty are appended, and also official documents concerning leprosy in Cologne and its vicinity, 1357-1712.

C. B.

Asen (Johannes). **Eine Leprosenordnung von Melaten bei Köln aus dem 16. Jahrhundert.** [Leprosy Regulations at Melaten near Cologne in the 16th century.] — *Lepra.* 1913. July. Vol. 14. No. 2. pp. 70-72.

The leper house at Melaten near Cologne dated back from the 12th century, and was the oldest and most important of those situated on the Lower Rhine. The instructions which were given to the officials and the certificate which had to be signed by the examining authorities are inserted *in extenso*.

C. B.

Clippingdale (S. D.). **The Leper Window.**—*Lepra.* 1913. July. Vol. 14. No. 2. pp. 78-79.

Leper windows are found in 13th and 14th century churches of England and Normandy. Their usual position is the south wall of the chancel. In the Roman Catholic Office for the seclusion of a leper, he is forbidden to enter churches, and in an old fresco in Eton College Chapel a priest is handing something to a person kneeling outside. Recently it has been suggested that these windows were not designed for the use of lepers, but the author on reviewing the evidence concludes that the windows were made for the benefit of some persons who were entitled to the offices of religion, but whose presence in the church was not permitted.

C. B.

Distribution.

La Lèpre dans les Colonies françaises.—*Gaz. des Hopit. Civils & Militaires.* 1913. July 31. Vol. 86. No. 86. pp. 1396-1397.

Leprosy is unevenly distributed in Indo-China. It is estimated that there are 4,000 to 5,000 lepers in Tonkin, 5,000 to 6,000 in Cochin China, and a few only in Annam.

In the year 1903 it was enacted that a leper asylum should be established at Culao-Rang in Cochin China, and that lepers should be segregated. In 1909 lepers were prohibited from parading the public streets, from occupying public offices, and from following certain callings.

Leper villages, situated 2 kilometers from the healthy population, are preferable to large leper asylums, such as that at Tre-Truong, 11 kilometers from Hanoi, where 986 lepers are accommodated. At the end of 1912 there were twenty of these leper colonies in existence. Leprosy is no longer on the increase in Indo-China.

C. B.

Blue (Rupert). **The Public Health Aspects of Leprosy in the United States.**—*Jl. Amer. Med. Assoc.* 1913. Sept. 20. Vol. 61. No. 12. pp. 943-946.

It is probable that leprosy was introduced into the United States from abroad. In the year 1901 there were 278 lepers, of whom 145 were born in the United States; only 72 were segregated. In 1912 the number was reported to be 146 in a population of 90 millions; all these lepers with a few exceptions were being treated in special institutions.

The disease is chiefly confined to the Atlantic seaboard, the Gulf Coast, the Pacific Coast, and the north central States, where it is on the wane. There are 696 lepers in Hawaii, where no cases were known before 1838; 2,754 in the Philippine Islands; and 28 in Porto Rico.

Leprosy is notifiable in 18 States. The Immigration laws forbid the landing of lepers, and provide that an alien leper may be deported within 3 years of his arrival. Railway companies

are not allowed to transport lepers from State to State. The author advocates the establishment of a National Leper Home.

In the discussion which followed Dr. Bracken stated that in the year 1900 there were 27 lepers in Minnesota, now there are 13 only. Seven were born in Minnesota. They are not segregated.

C. B.

Transmission.

Leboeuf (A.). **Notes sur l'Epidémiologie de la Lèpre dans l'Archipel Calédonien.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. 6. No. 8. pp. 551-556.

The author has been occupied for two and a half years in ascertaining if insects and acari play a part in the transmission of leprosy. Four or five per cent. of the 3,400 inhabitants of the coral island, Maré, in the Loyalty group, are lepers. There is no water on the island; hence there are no Simuliidae, Chironomidae, Anophelines, and very few other mosquitoes. In that part of the island of Lifou where mosquitoes are numerous, there is no leprosy, though it prevails elsewhere. It is improbable, therefore, that any of these flies carry the infection. Pediculi are not incriminated, for the men who are less verminous than the women are infected more frequently. Laboratory experiments with fleas and bugs are negative. Leprosy bacilli may sometimes be found in comedones which contain the demodex, and the author has already reported the presence of *B. leprae* in house-flies (see this *Bulletin*, Vol. 1, p. 558). He thinks that both may transmit the disease, but that the most common mode of infection is by the conveyance of the bacillus from person to person, or by contaminated articles. The zone of dissemination of the bacilli is narrow, for family infection is very frequently observed in New Caledonia. In his opinion the daily use of soap and water is one of the most important preventive measures. Tubercular leprosy, which at one time was the form observed in the large majority of cases, is being replaced by mixed, anaesthetic, and abortive leprosy.

C. B.

Thomson (David). **Preliminary Note on Bed-Bugs and Leprosy.**—*Brit. Med. Jl.* 1913. Oct. 4. p. 849.

Neither 105 bugs fed on lepers in Liverpool, Panama, and Trinidad, and 35 caught on the beds of lepers, nor 107 bugs which served as controls, contained acid-fast bacilli when they were stained by the Ziehl-Neelsen method.

[Skelton & Parham's observations are thus confirmed; see this *Bulletin*, Vol. 1, p. 559.]

C. B.

Bacteriology.

i. Fraser (Henry). **The Cultivation of the Bacillus of Leprosy.**—*Jl. Trop. Med. & Hyg.* 1913. June 2. Vol. 16. No. 11. p. 164.

ii. Fraser (Henry) & Fletcher (William). **The Bacillus Leprae: Has it been cultivated?**—*Lancet.* 1913. Sept. 27. pp. 918-921.

i. In this *Bulletin*, Vol. 2, p. 285, is an account of Fraser's failure to grow the *B. leprae*. He now gives particulars of his

experiments with placental agar. Thirty tubes were prepared according to WELLMAN's method,* and were inoculated with nodules of non-ulcerating leprous tissue removed under aseptic conditions from 22 patients who were free from ulcers in any part of their body. Contaminations were found in two tubes after 48 hours in the 37° C. chamber; the remaining 28 tubes remained sterile for 70 days. On this medium the tubercle bacillus grows more slowly than on glycerine-blood agar.

Thirty-five tubes of placental agar prepared according to the instructions received in a private communication from BAYON were inoculated with similar material. There was no evidence of growth in any of them after incubation at 37° C. for 85 days.

From ulcerated cases of leprosy and from post-mortem material many varieties of micro-organisms grow.

ii. The authors were working for 18 months with material derived from an institution in which were more than 250 lepers. Leper blood and normal blood media were employed both aerobically and anaerobically; no growth occurred in any of the 32 tubes though they were incubated for six months, except an early contamination in one. Thirty two serum and serum-glucose agar tubes remained sterile after inoculation with leprous nodules for 3 months. Williams' modification of Rost's medium, and Duval's amino-acid and egg albumen media were tried without success. BAYON prepares his agar from the juice of a placenta which has been frozen and thawed, by filtering it through Berkefeld and Doulton candles, and mixing the filtrate with glycerine agar. Thirty-five tubes were inoculated with leper nodules; there was no growth in 6 months.

Contaminations are visible in a few days. In some instances a crinkled brownish yellow micro-organism spread over the surface of the agar; this consisted of non-acid-fast rods among which were scattered large acid-fast coccoid spores. It is possible that some observers have mistaken such bodies for the *B. leprae*. Sometimes a saprophytic streptothrix was encountered.

Summary.

"Material for purposes of cultivation on various media has now been obtained from 32 non-ulcerating nodular cases of leprosy and 373 inoculations made on various culture media. It is curious, in view of the findings of other investigators, that we have consistently failed to obtain a culture of *B. leprae* . . . . . From the examinations made of nodules which have been incubated on culture media for periods ranging from a few days to nine months, no evidence has been obtained that the bacilli had increased or lessened in number."

[This careful and exhaustive investigation renders it improbable that any one of the 20 or more "*B. leprae*," isolated by various observers, is the cause of leprosy.]

C. B.

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* *Centralbl. f. Bakt.* 1. Abt. Orig. 1912. Vol. 66. pp. 142–143.

Duval (Charles W.) & Harris (William H.). **Further Studies upon the Leprosy Bacillus. Its Cultivation and Differentiation from other Acid-fast Species.**—*Jl. of Med. Research.* 1913. May. Vol. 28. (New ser., Vol. 23.) No. 1. (Whole No. 137). pp. 165-198.

A medium is prepared by digesting protein for several days with trypsine, heating to 70° C. and passing through a Berkefeld candle N. and mixing with sterilized agar. [The sterility of such a medium is doubtful.] Nodules from 8 lepers were planted on this. After about a fortnight's incubation at 37° C. small colonies appeared in four of the cases. They attained their maximum in 8-10 weeks. The growth consisted of acid-fast rods. Animal experiment is not of use in distinguishing acid-fast bacteria, for the same lesions are induced by all whether they be the Timothy grass, milk, butter, smegma or the reputed leprosy bacilli. Intraperitoneal inoculation of material from the 8 lepers failed to excite the disease in the lower animals; injections of the bacillus isolated were also harmless.

There are at least 20 so-called leprosy bacilli. Levy's and Kedrowsky's cultures correspond in some respects with avian tuberculosis, in others with Moeller's smegma bacillus. Rost's and Williams' cultures are identical with Grasburger's acid-fast saprophyte. Karlinski's strain is similar to Rabinowitch's butter bacillus.

In the discussion* on the leprosy bacillus in the section of Bacteriology at the International Congress of Medicine Duval is reported to have said that he had made several mistakes, and had stated openly that he had cultivated the leprosy bacillus, and that he now frankly admitted that he was mistaken. He denied that any one had been successful.

C. B.

Reenstierna (John). **Ueber die Kultivierbarkeit und Morphologie des Lepra-Erregers und die Uebertragung der Lepra auf Affen.** [The Culture and Morphology of the Leprosy Microbe, and the Transmission of Leprosy to Apes.]—*Arch. f. Dermat. u. Syphilis.* Orig. 1913. July. Vol. 116. No. 3. pp. 480-554. With 15 plates.

The author defines "acid-fast" as capable of retaining the stain after immersion for 15-30 seconds in a 10 per cent. dilution of nitric acid in alcohol. [The term acid-fast is usually applied to those micro-organisms which are not decolorized by long treatment with 33 per cent. nitric, or 25 per cent. sulphuric acid. Smith and Bisset have shown that tubercle bacilli still appear red after 24 hours' immersion in 25 per cent. sulphuric acid, and leprosy bacilli up to 16 hours. Hence it is doubtful whether the bacteria which the author describes as acid-fast should be included in this class.] The material investigated was obtained from a patient who had been suffering from nodular leprosy for

* See *Brit. Med Jl.* 1913. Aug. 23. p. 468.

5 years. [It is not stated whether it was an ulcerating case.] Streptococci were grown from the blood; these were mixed with "acid-fast" rods in subcultures which survived for four generations only. Growth appeared in all the tubes in 24 hours. Cultures of the leproma contained a streptothrix, diphtheroids, and after five days, "acid-fast" rods. By treating the mixed growth with 10 per cent. antiformin the "acid-fast" microbe was isolated in a pure condition, but it died after the second subculture.

An emulsion of the leproma was injected into the nose of a macacus; 39 days later gangrene of the part set in from which the animal died in three days. Clumps of "acid-fast" bacilli were present in the necrotic tissues. Another macacus died 59 days after an intraperitoneal inoculation of the same emulsion. Caseous deposits were found in almost all the viscera, in which were "acid-fast" bacilli. Five guinea-pigs inoculated with this material died in about a month. [The post-mortem appearances in them were those of tubercle.] For other animal experiments see the epitome of his preliminary report (this *Bulletin*, Vol. 1, pp. 194, 195). There is a good summary of previous bacteriological and experimental work, and a bibliography which occupies 6 pages. [The evidence adduced is insufficient to show that any of the bacteria isolated plays a part in the causation of leprosy.]

C. B.

Rost (E. R.). **On the Leprosy Bacillus and Allied Bacilli.**—*Med. Press.* 1913. Sept. 24. Vol. 147. (New ser., Vol. 96.) No. 3881. pp. 349-351.

The author insists that the cultures which he obtained from lepers before the year 1904 were those of the leprosy bacillus, because the "leprolin" prepared from them cured 7 lepers. He admits, however, that the use of this remedy was prohibited by the Government of India on the ground that contaminated cultures entered into its composition. He claims that he has isolated the *B. leprae* from the blister serum or fluid expressed from the nodules of 6 lepers. The cultures contain a non-acid-fast streptothrix which gives rise to acid-fast rods, and a non-acid-fast diphtheroid which also produces acid-fast elements. Colonies appear in 2 or 3 days when incubation is carried out at 30° C., the optimum temperature.

When these micro-organisms are injected into the peritoneal cavities of mud-fish and frogs, after an interval of 1-3 months small white vesicles stud the peritoneum, which contain acid-fast bacilli. He states that leprosy can be induced in monkeys by repeated injections of his cultures.

He now prepares leprolin from 6-week-old broth cultures of 7 micro-organisms isolated from lepers, by filtering the fluid through blotting paper and sterilizing. One to three cc. are injected into the muscles every week. A smart reaction ensues in advanced tubercular cases, but he says vaccines of the smegma

and Timothy grass bacilli cause similar symptoms. He states that chronic ulcers heal rapidly, though suppuration of the nodules sometimes occurs.

Of 30 lepers treated with this new leprolin since 1909, 4 have been cured, and improvement has been noted in many others.

[The bacteria described by Rost are not identical with *B. leprae* according to the opinion of most investigators who have studied the bacteriology of leprosy.]

C. B.

Santamaria (J. Martinez). **Acquisition of Acid-fast Properties by a Filamentary Organism cultivated from an Animal injected with a Culture of Hansen's "Bacillus."**—*Jl. Trop. Med. & Hyg.* 1913. Oct. 1. Vol. 16. No. 19. p. 301.

Four weeks after the injection of Kedrowsky's micro-organism into the abdominal cavity of a mouse, nodules were found on the peritoneum. Cultures of the spleen resulted in the growth of non-acid-fast branching filaments which became acid-fast after cultivation on Dorset's medium for 14 months. Acid-fast bacilli also appeared in large numbers.

[The title is misleading since it has not been proved that Kedrowsky's culture is identical with *B. leprae*.]

C. B.

Harris (Wm. H.) & Lanford (John A.). **The Complement Fixation Test (Gay's Modification of the Besredka Method) in the Differentiation of Acid-fast Bacilli.**—*Jl. of Infectious Diseases.* 1913. Sept. Vol. 13. No. 2. pp. 301-308.

The bacilli investigated were Kedrowsky's, Levy's, Clegg's, Karlinski's, Duval's, Rabinowitch's butter, Timothy grass, dung, smegma, Korn I, Grassburger's butter, and *B. phloei*. Five thousand agglutination tests were made with the sera of rabbits immunized with these acid-fast cultures. The results showed that they were of little value, and incapable of determining the identity of any with *B. leprae*, but emulsions of *B. leprae* from the tissues are not clumped by leper serum.

Gay's method of preparing antigen is to add alcohol to emulsions of the bacilli, centrifuge, and grind up the dried precipitate with such a quantity of salt that a 2 per cent. emulsion of the dried rods shall contain 0·85 per cent. of salt; 0·5 cc. of these suspensions was the dose injected into the veins of rabbits on each occasion.

Conclusions—

"Rabbits injected with whole bacilli or extracts of many of the members of the acid-fast group produce anti-substances of a high titre.

"The whole bacilli produce antibodies of lower potency than those produced by the Besredka antigen. This antigen produces the most potent antibodies when injected intravenously at 3-day intervals for 4 injections and the animal bled after 8 days.

"Regardless of the various methods used to produce these sensibilizators, no clear-cut specificity for complement fixation has been found for the acid-fast bacilli made use of in these experiments."

C. B.

Tsurumi (M.). **Ueber die Präzipitation und Komplementbindung mit Cuorin bei Lepra und die Beziehungen von Cuorin und Lecithin zu Lepraseren bei den Reaktionen.** [Precipitation and Complement Deviation of Leper Serum with Cuorin, and the Cuorin and Lecithin Reactions compared.] — *Zeitschr. f. Immunitätsforsch. u. exper. Therapie.* 1 Teil. Orig. 1913. Aug. 5. Vol. 19. No. 1. pp. 19-30.

The sera of 36 lepers, 23 suffering from the nodular form, and 13 from the anaesthetic, were investigated. For the precipitation test a 0·1 per cent. dilution of cuorin was used. [Cuorin is a lipoid allied to lecithin, belonging to the group of monaminodiphosphatides. It is obtained from the heart, traces only being present in other muscles. It is soluble in ether, but is insoluble in alcohol.] 75 per cent. of the sera were precipitated by cuorin, 20 out of the 23 nodular cases being positive, and 7 of the 13 anaesthetic lepers being negative. The complement deviation test with cuorin as antigen confirmed the precipitin test except in one instance. These reactions do not vary with the severity of the disease. The antibodies on which the reactions depend are present in the blood, pleural and pericardial fluids of the leper, but are absent from the bile. They are destroyed by heating at 63° C. for 30 minutes. The results obtained by lecithin and cuorin respectively are not always concordant.

C. B.

Serra (Alberto). **La Séro-Réaction de Wassermann chez les Lapins inoculés de Lèpre à la Chambre Antérieure de l'Oeil.**—*Lepra.* 1912. Vol. 12. No. 3. pp. 139-146.

The complement deviation test was applied to the sera of 30 rabbits one to four months after their inoculation with human leprous tissue, or with the nodules excited in rabbits' eyes by the injection of such matter, or with Serra's bacillus (see this *Bulletin*, Vol. 2, p. 65). The result was positive in 90 per cent., when an extract of leprous tissue was used as antigen, and in 76 per cent. when a syphilitic antigen was employed. Before inoculation the sera of all but three animals were negative.

The blood of two lepers gave a positive response with an extract of the nodules of rabbits' eyes. The serum of an anaesthetic leper was negative to this antigen.

The author believes that the granuloma which appears at the site of inoculation of leprous material, or of his bacillus, in the eye of the rabbit, is a true leproma, and that his bacillus is the *B. leprae.*

C. B.

Verrotti (G.). **Risultati ottenuti dalle Inoculazioni intraperitoneali di Emulsione di Leproma nei Conigli.** — *Giorn. Italiano d. Malattie Veneree e d. Pelle.* 1913. Mar. 28. Vol. 54. (Anno 48.) No. 1. pp. 82-91. With 1 coloured plate.

The granuloma which develops at the site of inoculation in the anterior chamber of the eye of a rabbit after the introduction of leprous material, is probably caused by the toxin of the leprosy bacilli, and not by their proliferation.

Half a cc. of an emulsion of leprous nodules, derived from a non-ulcerating case, was injected into the peritoneal cavity of each of four rabbits without result, except that the Wassermann reaction about two months later was positive in one, a leprous antigen being used.

Two cc. of the emulsion were introduced into the abdominal cavity of each of four rabbits which had been subjected to the eye experiments a year previously. In three, nodules formed in the peritoneum, liver or eye, which suggested growth of the lepra bacilli, although their presence could not be detected microscopically. The serum reaction to leper tissue extract became positive in all three rabbits.

C. B.

Spindler (A.). **Bemerkungen über den Komplementgehalt und die Wassermannsche Reaktion des Blutes Lepröser.** [Wassermann Reaction in Lepers, and the Amount of Complement in their Blood.] — *Dermatol. Centralbl.* 1912. Dec. Vol. 16. No. 3. p. 69.

The complement-titre of 16 lepers was not infrequently normal, but it was often reduced to one half or less, though absence of complement was not observed in any case.

Meier noted that when 0·2 cc. of leper serum was employed in the Wassermann test a negative response was given, but when the leper serum was reduced to 0·005 cc. the reaction was positive. Spindler has confirmed this observation in seven cases. He thinks that this phenomenon is of aid in distinguishing leprous from syphilitic serum.

C. B.

Clinical.

i. Marchoux (E.). **Etiologie et Prophylaxie de la Lèpre.**—*Bull. Soc. Française de Dermatol. et de Syphiligraph.* 1913. May. Vol. 24. No. 5. pp. 247-253.

ii. **La Lèpre.** — *Rev. d'Hyg. et de Police Sanitaire.* 1913. Aug. 20. Vol. 35. No. 8. pp. 883-939.

(i.) The matter in this paper is amplified in (ii.). In the discussion which followed, Gaucher stated that he sees some ten lepers every year in Paris who freely associate with their fellow men. He advocates notification and isolation of lepers. Foreign lepers should be excluded.

Gougerot remarked that the manner of grouping of the *B. leprae* in the large lepra cells is not absolutely specific: since identical appearances may be seen in some tubercular lesions, such as tubercular ulceration of the tongue. He inoculated 30 rats with human leprous tissue, with no other result than the production of granulomata, similar to those which are caused by the injection of almost any kind of foreign matter. Human leper serum is polyvalent, that is, it can deviate complement in the presence of divers antigens. Lepers react to various toxins, to nastin for instance, which is prepared from a streptothrix which is not *B. leprae.*

(ii.) This is the best monograph on leprosy which has been published lately. It embraces critical reviews of all recent work, to which a copious bibliography is given.

In the 13th century there were 19,000 leper houses scattered throughout Europe; 2,000 in France alone. In the 17th century the disease had almost disappeared. The infection still lingers in parts of Brittany, Provence, Alpes Maritimes and Auvergne. It is prevalent in Spain and Portugal, and in the countries along the Mediterranean. There is a small focus in Switzerland. Lepers were numerous in the Scandinavian peninsula, but their number is decreasing. It is estimated that there are 100,000 lepers in India, 13,000 in Indo-China, 25,000 in Japan, and 3,000 in the Philippines. Leprosy is the scourge of Oceana.

The incubation period is usually from 2 to 5 years, but it varies from 8 months to 32 years. Attacks of intermittent fever, dryness and hyperaesthesia of the skin, and rheumatic pains are among the first symptoms of the disease. Twenty references are given to papers on the serum diagnosis of leprosy. Many antigens have been employed with which positive results were obtained. In anaesthetic cases the serum is generally negative. The author doubts whether the *B. leprae* has been isolated, since no one has succeeded in inducing leprosy in the lower animals with cultures. Inoculation with leprous material, however, is also unsuccessful. The lesions which follow the introduction of such matter into the eyes of rabbits are not due to the proliferation of the *B. leprae*, for the same changes occur when the bacilli are killed before injecting. Monkeys are immune. Danielssen inoculated himself and nine of his pupils with leprous discharges and tissues without exciting the disease. Profeta and Bargilli made similar unsuccessful experiments. Altogether about 60 people have submitted to such injections without harm. The criminal Keanu developed leprosy 6 months after the insertion of a leproma in his forearm. Ashmead states that in Japan vaccine lymph from leprous infants is used with impunity. Gairdner, however (*Brit. Med. Jl.* 1887, Vol. 1, p. 1269), reported two cases of infaction transmitted by vaccination (see also this *Bulletin*, Vol. 1, p. 192). The part played by contact is exemplified by the case reported by Benson: a man who had never left Ireland contracted the malady by sleeping in the same bed and wearing the same clothes as his leprous brother. Other similar instances are quoted. Several investigators have discovered leprosy bacilli in the droplets of mucus or saliva ejected by lepers. The author does not favour the view that leprosy is transmitted by insects. He states that acid-fast bacilli resembling the *B. leprae* are found frequently in many arthropods. Moreover the easily inoculable leprosy of rats is not conveyed by insects. The author dwells on the analogies between these two infections, and thinks that they bear the same relation to each other as the avian tubercle bacillus to the human. In both human and rat leprosy the bacilli may lie latent for long periods. Secondary infections can light up the disease in both instances.

The preventive measures in force in Norway have effected a reduction in the spread of leprosy. The leper lives with his family, but in a room apart, washing and boiling his own clothes and the articles used by him.

C. B.

Boeckmann (Eduard). **Clinical Aspect of Leprosy.**—*Jl. Amer. Med. Assoc.* 1913. Sept. 20. Vol. 61. No. 12. pp. 946-949.

The initial lesion of leprosy, if it exists, has never been discovered. At the onset of the infection a change is noticed in the mental demeanour of the patient, he becomes listless, drowsy, and depressed, he complains of malaise and pains in his limbs; his face becomes puffy and of dusky hue, and his cornea is surrounded by a yellowish zone in his sclerotic.

In nodular leprosy the preliminary skin eruption consists of ill-defined livid or pigmented areas on the face and ears; the rest of the body remains free. In anaesthetic leprosy well-defined isolated erythematous spots appear on any part of the body except the scalp; these maculae may last for a few days only or they persist for months.

Lepromas usually remain stationary for years, after which they may undergo absorption or ulceration; healing may result. Eruptions of new nodules may occur suddenly; these outbreaks are accompanied with fever and constitutional symptoms.

In nerve leprosy the anaesthetic areas are generally found on the forearms and hands, on the legs and feet, and on the body, face and eyes. Acute rheumatic affections of the joints are not infrequent. As the neuritis proceeds, paresis and atrophy of muscles ensue ending in ulcerations and mutilations. The olfactory, optic and acoustic nerves escape.

C. B.

Breda (Achille). **La Lepra del Globo Oculare e dei suoi annessi.**—*Gior. Ital. d. Malatt. Veneree e d. Pelle.* 1913. May 10. Vol. 54. (Anno 48.) No. 2. pp. 214-255.

The clinical histories of 37 lepers are given: 7 were suffering from nodular leprosy; 14 from anaesthetic; and 16 from mixed leprosy. Since the year 1890, 29 of these patients have developed leprous lesions of the eyes. Nastin, antileprol, salvarsan and neosalvarsan have had little or no curative effect. The thermocautery is useful in limiting the advance of the leproma towards the cornea.

Inoculations of leprous tissue into the cornea, anterior chamber, peritoneum, testis and skin of dogs, rabbits, and sheep failed to cause proliferation of the leprosy bacilli.

C. B.

Dyer (Isadore). **The Dermatologic Aspects of Leprosy.**—*Jl. Amer. Med. Assoc.* 1913. Sept. 20. Vol. 61. No. 12. pp. 950-951.

Macular leprosy must be distinguished from syphilis and from erythema multiforme; from the former by the leprous eruptions

preferring the extensor surfaces, by their large size and by the dusky colour of the pigmented forms; from the latter by the duration of the leprous rash for weeks or months, and by the absence of fading on pressure in the pigmentary and infiltrated forms of macular leprosy. Iodide eruptions sometimes resemble leprosy.

The small tubercles of leprosy appear as clusters of pellets of bees-wax embedded in the skin of the back of the hands, chin, lips, and cheeks; they are anaesthetic. In lupus the tubercles are purple and ulcerate early, in syphilis the lesion is crescent-shaped, and leaves a pigmented scar. Xanthoma presents deep-seated, flat, smooth, lissom, yellow, tender tubercles.

Bullous leprosy is an early form which appears over the joints of the hands and feet; pigmented scars are left.

A diffuse pigmentation of the whole body may occur in leprosy; in vitiligo the margin is abrupt, in Addison's disease the pigment is localised, and in mycosis fungoides there is staining under furfuraceous scales.

In scaling leprosy there is wrinkling of the skin which becomes dirty gray and atrophic. In xerosis there is hypertrophy of the skin, and the desquamation is greater.

The neurotic leprous ulcer is recognised by its deep cylindrical cavity, its indurated well-defined edges, and its foetid odour.

C. B.

Kirby-Smith (J. L.). **Tubercular Leprosy in a Negress.**—*New York Med. Jl.* 1913. Oct. 11. Vol. 98. No. 15. p. 708. With 1 illustration.

The illustration shows extensive nodular leprosy of the face of a woman aged 22 years. *B. leprae* were found in the nasal ulcerations. The disease was of three years' duration and had not been benefited by chaulmoogra oil, but some improvement was observed after the exposure of the nodules to X-rays.

Jacksonville, Florida, where she had resided since infancy is almost exempt from leprosy; the source of infection could not be discovered; her parents and husband were healthy.

C. B.

de Beurmann & Gougerot. **Bacillurie et Bacillémie Hansénienne. Le Rein des Lépreux.**—*Lepra.* 1913. July. Vol. 14. No. 2. pp. 73-77.

A leper developed chronic nephritis accompanied with attacks of haematuria. After many examinations extending over several months, two acid-fast bacilli were found.

In another advanced case of leprosy acid-fast bacilli were discovered in the blood during a febrile attack, and also in the urine, although there were no signs of renal disease.

C. B.

Biehler (R.). **Wundheilung bei Lepra.** [Healing of Wounds in Leprosy.]—*Deut. Zeitschr. f. Chirurgie.* 1913. Sept. Vol. 124. No. 1/4. pp. 47-52. With 4 text-figs.

Lepers withstand surgical infection better than the healthy. Their wounds heal readily although sloughing. Cicatrization takes place more quickly in nodular than in mixed and nerve leprosy. The ulcers of pure nerve leprosy due to trophic changes contain no *B. leprae*; these are intractable.

Under nastin, antileprol, baths, tincture of iodine, oil of camphor, icthyol and zinc perhydrol all the chronic ulcers on the legs and feet of a man who had been a leper for 8 years, healed in 3 months. *B. leprae* were abundant in the discharge. Two years later the lepromata had subsided, but the ulnar and peroneal nerves were affected; an ulcer broke out on his foot which resisted all treatment. Another leper of 5 years standing suffered from chronic ulcers of his legs which healed with the same remedies in 2 months. Nerve symptoms came on a year later and some time afterwards ulcers developed on the soles of both feet which were refractory to all remedies. The greater part of the left leg of a man who had been afflicted with leprosy for 16 years had been ulcerated for five years. Healing of the ulcer was complete in 7 months. Anaesthesia of the ulnar and peroneal nerves ensued; 4 months later the scar broke down and remained open permanently.

C. B.

Barbézieux (G.). **Contribution à l'Etude de l'Hérédité Lépreuse. Malformations congénitales observées chez Deux Consanguins issus de Parents Lépreux.**—*Rev. de Méd.* 1913. Sept. 10. Vol. 33. No. 9. pp. 737-744. With 4 text-figs.

Leprosy is not inherited, for the offspring of lepers removed from their parents remain free from the disease; but the progeny of lepers may be defective. The Cagots of the middle ages were the descendants of lepers inhabiting the Pyrenees, and though not all lepers themselves, most of them suffered from malformations of the hands or feet, or from some other deformity.

At Tonkin the daughter of leprous parents, aged 26, presented no signs of leprosy. Only a middle finger existed on each hand, the carpus was massed together, and all the metacarpal bones except the 3rd and 4th were deficient. The 2nd, 3rd and 4th metatarsal bones of both feet were wanting and there was fusion of two cuneiform bones with the cuboid.

The brother, aged 22, probably an early anaesthetic case, exhibited a nearly similar malformation in his hands and feet.

C. B.

Morbid Anatomy.

Serra (Alberto). **Di un Raro Particolare Strutturale del Sistema Venoso Parenchimale nelle Capsule Surrenali di un Leproso.**—*Pathologica.* 1913. June 15. Vol. 5. No. 111. pp. 347-351.

Nodules of muscular tissue invaded the lumen of the veins of the medullary substance of the adrenals of a leper.

C. B.

LOMBARDO (C.). **Singolari Formazioni di Elastina entro Cellule Giganti in Casi di Lepra.**—*Giorn. Italiano d. Malattie Veneree e d. Pelle.* 1913. Mar. 28. Vol. 54. (Anno 48.) No. 1. pp. 75-79.

From one to six stellate bodies, 3-5 μ in diameter, which answered to the chemical and staining tests of elastic tissue were found in the giant cells of the skin lesions of two cases of leprosy. Similar inclusions have been seen by other observers in lupus, chronic inflammatory conditions of the lungs, and in uterine fibroids.

C. B.

TREATMENT.

HEISER (Victor G.). **Leprosy. A Note regarding the apparent Cure of Two Lepers in Manila.**—*U.S. Public Health Rep.* 1913. Sept. 5. Vol. 28. No. 36. pp. 1855-1856.

Leprosy bacilli were found in the scrapings of thickened reddish spots on the nose of a Filipino, aged 27, in the middle of the year 1909. Under vaccine [nature not stated] treatment for a year no change was noted. He was then given chaulmoogra oil, at first by mouth, then hypodermically combined with oil of camphor and resorcin for nearly a year. In June, 1913, he had apparently recovered; no *B. leprae* could be discovered, and he had been free from lesions for a year.

In January, 1910, scrapings of the red macules on the cheeks, forehead and chin of a Filipino woman, aged 22, contained leprosy bacilli. Injections of vaccine for 5 months, combined with the oral administration of chaulmoogra oil for 3 months, followed by chaulmoogra oil, camphor and resorcin hypodermically, resulted in an apparent cure. In June, 1913, there was no evidence of leprosy on clinical and microscopical examination.

There are now in the San Lazaro Leper Hospital numerous cases treated by chaulmoogra oil alone, which have been free from signs of leprosy for 22 months.

C. B.

RUDOLPH (Max). **Beitrag zur Nastinbehandlung der Lepra.** [Nastin Treatment of Leprosy.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Oct. Vol. 17. No. 19. pp. 669-671. With 1 plate.

The author has reported five cases of leprosy treated with nastin in which improvement occurred in all except one. He now records his sixth case. A leper who had been afflicted for 5 years and incapacitated for 2 years suffered from the mixed form of the infection, complicated with iritis. In the course of 18 months he received 3 injections of nastin B.°; 8 of nastin B.^{1}; and 12 of nastin B.^{2}. After 6 months' treatment the iritis disappeared and the anaesthesia was less; the lepromata on the hands and forearms were softer, but leprosy bacilli were still present. At the end of 18 months he had much improved, the

leonine expression of his face was much less marked, and *B. leprae* were not discovered in his nasal secretion. The photographs taken before and after treatment afford convincing evidence of the improvement which took place.

The author has not seen such favourable results with other remedies, including salvarsan and chaulmoogra oil, in his nine years' experience with hundreds of lepers. He advocates intermittent courses of nastin combined with chaulmoogra oil by the mouth.

C. B.

Serra (Alberto). **L'Antiléprol dans le Traitement de la Lèpre.**—*Lepra.* 1913. July. Vol. 14. No. 2. pp. 63-69. With 8 figures.

This is a translation into French of the paper which appeared in *Giornale Italiano delle Malattie Veneree e della Pelle* (see this Bulletin, Vol. 2, p. 64).

C. B.

Serra (Alberto). **Alcuni Casi di Sifilide, Lepra e Psoriasi trattati col "606."**—*Giorn. Ital. d. Malattie Veneree e d. Pelle.* 1913. May 10. Vol. 54. (Anno 48.) No. 2. pp. 182-213.

A single intravenous or intramuscular injection of 0·4 to 0·6 gram. of salvarsan was given to three lepers without benefit. In all the complement deviation test with a leprous antigen was positive.

C. B.

Loehe (H.). **Beitrag zur Chirurgie der Nervenlepra.** [The Surgery of Nerve Leprosy.]—*Zum 4. Oktober* 1913, *dem 60 Geburtstage Seiner Exzellenz des Generalstabsarztes der Armee und Chefs des Sanitätskorps Prof. Dr. Otto v. Schjerning. (Eine wissenschaftliche Festgabe aus den Reihen des Sanitätsoffizierkorps.)* pp. 129-135. [1913. Berlin: Ernst Siegfried Mittler und Sohn.]

Leprosy is a rare disease in Germany. Indigenous cases are limited to the extreme north-east of the Province of East Prussia.

A native of Brazil developed a spot on the back of his left hand in 1911, followed some months later by paralysis of the muscles supplied by the radial nerve which was thickened. It was therefore resected in January, 1913. A few *B. leprae* were found in it, although none were discovered in the nasal secretion or skin lesion. In discussing the diagnosis attention is drawn to the similarity of Boeck's multiple benign sarkoid of the skin, an infectious granuloma, to leprosy.

He quotes the case reported by Cramer in which the whole of the median, ulnar, and external cutaneous nerves were excised. The patient recovered from leprosy and was in good health 18

years later. Sederholm performed a similar operation on a leper who was free from active signs of the disease when examined nine years afterwards.

The author believes that anaesthetic leprosy can be cured by operation. [But see this *Bulletin*, Vol. 2, pp. 286 and 289, where it is noted that Impey states anaesthetic cases recover, and that Sandes aggravated the symptoms by excision of the nerve.]

C. B.

Goodhue (E. S.). **The Surgical Cure of Leprosy, based on a New Theory of Infection.**—*New York Med. Jl.* 1913. Aug. 9. Vol. 98. No. 6. pp. 266-268. With 3 figs.

This paper is a confused medley of extracts from various writers, together with statements which are not in harmony with our knowledge of leprosy, such as "Leprosy is more frequently than otherwise primarily a localised disease; as such it may be eradicated by suitable topical remedies, or careful surgical interference," and "The whole period between infection and development of the primary lesion (incubation) may be as short as five days." No details are given.

C. B.

Prophylaxis.

Peiper (Otto). **Die Bekämpfung der Lepra in Deutsch-Ostafrika. Auf Grund amtlichen Materials bearbeitet.** [The Control of Leprosy in German East Africa.] — *Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1913. May. Vol. 17. Beiheft 4. 105 pp. [183-283.) With 34 text-figures, 3 plates, and 2 maps.

In the year 1909 there were nearly a thousand lepers segregated in leper villages and camps in German East Africa. In 1912 3,800 lepers and their families were living in 47 leper homes and villages. Besides these it is estimated that several thousand lepers were at large. The anaesthetic cases are twice as numerous as the nodular.

Of 31 lepers treated with nastin since the year 1907, three are believed to have recovered and six have much improved. Chaulmoogra oil had no good effect.

The administrative measures which have been taken for the suppression of leprosy in the 22 districts of the colony are described, and the details of the cost of maintenance of the leper community are given. It is good policy to decentralise rather than to collect the infected in one large asylum. The family life need not be disturbed, though there are risks. An instance is quoted of a woman in good health having lived with her leprous husband for many years; *B. leprae* were discovered in a small ulcer on her nasal septum.

C. B.

Bayon (H.). **Report by the Government Research Bacteriologist (Leprosy) on the Necessity or Advisability of Segregation in Relation to the Conditions and Spread of Leprosy in South Africa at the Present Time; the Measures to be provided for the Prevention and Cure of Leprosy; and the Suitability of Robben Island as a Place of Detention for Lepers.**—*S. Africa Med. Rec.* 1913. May 24. Vol. 11. No. 10. pp. 187-194.

In support of the author's opinion that lepers should be segregated, he quotes the case reported by de Beurmann, in which a French sailor contracted leprosy after a stay of 20 hours only in an endemic area, and that recorded by Lochts where a leper infected 28 persons. He refers to Goldschmidt's account of a child who developed leprosy six years after being nourished for four weeks by a leprous wet nurse, and to Saltzman's history of a leper who infected four wives in succession. He states that there are two observations which show that the disease was contracted in the United Kingdom from cases imported from abroad. In Russia and the Dutch East Indies, where restrictive legislation has been allowed to lapse, the number of lepers has increased. The adult healthy relatives of lepers may live in the settlement if they conform with the regulations, since lepers under proper supervision generally cease to be a source of infection.

The three leper asylums and the two leper settlements in the South African Union can accommodate less than two-thirds of the total leprous population. The water supply of Robben Island is defective though otherwise the island is not unsuitable for a leper settlement, if the other residents were removed.

C. B.

Gomes (E.) & Terra (F.). **Prophylaxia da Lepra.**—*Brazil Medico.* 1913. July 22. Vol. 27. No. 28. pp. 288-289.

The establishment of colonies of lepers is advocated, in which those that are able shall have facilities afforded them of useful employment. There should be a small hospital which must contain an operation theatre and a laboratory. An incinerator is necessary.

C. B.

Vampré (Enjolras). **Prophylaxia da Lepra.**—*Revista Med. de S. Paulo.* 1913. Feb. 28. Vol. 16. No. 4. pp. 76-78.

It is urged that leper colonies and asylums should be established in the State of São Paulo where leprosy is on the increase; in 14 towns alone there are 300 lepers. The benefit of prophylactic measures is shown by the experience of Norway, where there were nearly 3,000 lepers in the year 1856; in 1907 their number had been reduced to 438. Japan has spent 900,000 marks on the construction of leper sanatoria; in the Sandwich Islands a quarter of a million sterling has been devoted to the same purpose.

The author gives a draft of bye-laws which he thinks would be effective in controlling the spread of leprosy in the State of S. Paulo.

C. B.

Rat Leprosy.

Meyer (Carlos). **Instituto Bacteriologico do Estado de S. Paulo. Relatorio sobre a administraçao e os trabalhos do Instituto durante o anno de 1912.** [Report of the Bacteriological Institute of S. Paulo for the year 1912.]—*Revista Med. de S. Paulo.* 1913. Feb. 15. Vol. 16. No. 3. pp. 56-61. [Leprosy of Rats. p. 60.]

Among 135 rats sent to the laboratory under suspicion of plague infection rat-leprosy was discovered in two. Acid-fast bacilli were seen in the enlarged lymphatic glands. It was not known previously that the disease existed in Brazil, or other parts of South America.

C. B.

PLAGUE.

Liston (W. Glen). **Plague.**—*Trans. xvii. Intern. Congress of Med. London,* 1913. Section xxi. Trop. Med. & Hyg. Part 1. pp. 9-23: and [in abbreviated form] *Jl. Trop. Med. & Hyg.* 1913. Sept. 15. Vol. 16. No. 18. pp. 273-275.

The paper is in two sections. The first deals with "The Epidemiological Features of Bubonic and Pneumonic Plague contrasted."

Plague pneumonia epidemics in India have not been infrequent. They have however always been limited in size in response to prompt measures. In the case of the bubonic form of the disease, however, the infection was more difficult to control and the infective property appeared rather to belong to the home than the patient. This led many workers to search for the bacillus in infected houses, without any success. The connection between rats and plague and the suggestion that the rat flea was an infecting agent led Liston to use guinea-pigs as flea traps, and in the stomachs of fleas so captured in infected houses he was able to demonstrate the plague bacillus. He showed, moreover, that rat fleas could be caught on men and this suggested an obvious mode of infection. Laboratory work by French workers showed plague was conveyed from rat to rat by the flea. The Indian plague commission showed infected rats were not directly infectious in the absence of fleas.

The international commission appointed by the Chinese Government showed that in the case of the pneumonic type the rat played no part in its spread. Man to man infection was the rule and though many plague houses were rat-infested the rats did not take the disease. It was shown that the bacillus of pneumonic plague was no more virulent than the variety obtained from bubonic cases.

Strong has shown that the spread of infection in this variety is largely due to the coughing of the patient, and the contaminated area varies in radius according to several factors. Liston is of opinion that one of the important factors is air temperature and that the radius of spread of the droplets will be greater in colder atmospheres. This he believes is the reason of pneumonic plague prevailing in cold and temperate climates more than in hot ones. Some historical corroboration of this view is given. The pneumonic plague was easily checked in China on the adoption of suitable measures, but in India on the other hand bubonic plague does not yield to the most strenuous hygienic efforts of the administration.

Part II. Liston points out the long intervals between epidemics and that these epidemics depend on rat epizootics. These two facts he endeavours to correlate with the different susceptibility of the rat in different districts at different times. He shows that Madras rats (*Mus rattus*) are much more susceptible to plague than Bombay or Poona rats, tested by the subcutaneous injection of known quantities of bacteria or by the method of natural flea infection. Now Madras has been practically free from plague, while the other cities have been severely attacked by it, so that we have to believe that the existence of plague in a centre is

associated with the production of a relatively immune race of rats and this immunity ultimately reduces the possibility of the natural epizootic. This immunity of the rat population is transmissible to their young.

W. J. Penfold.

Kitasato (S.). i. **On the Value of the Search for Rat Fleas in the Detection of Plague.**—*Trans. xvii. Intern. Congress of Med. London.* 1913. Section xxi. Trop. Med. & Hyg. Part 1. pp. 1-7.

ii. **Ueber die Pest. Die Wichtigkeit des "Rattenflohes" zur Feststellung der Verbreitung von Pest.** (Nach einem Vortrage, gehalten in dem xvii Internationalen medizinischen Kongress, London, 1913).—*Berlin. Klin. Wochenschr.* 1913. Oct. 13. Vol. 50. No. 41. pp. 1881-1884.

The papers contain a résumé of observations made at Kobe in 1909 and 1910.

The plague incidence in rats and men was found maximal in winter. From trapped and purchased rats 3,234 fleas were examined. Ceratophyllus constituted 86·3 per cent. while the common Indian rat flea formed only 4·7 per cent. All the types except *X. cheopis* were most prevalent in the winter during the months January to June, while *X. cheopis* was most prevalent in November and had disappeared by March. Following the recommendations of the Indian Plague Commission guinea-pigs were allowed to run freely for 24 hours in suspected houses; the fleas so obtained were examined in reference to plague infection and of course the plague mortality of the guinea-pigs was noted. The guinea-pig mortality from the sojourn in plague and neighbouring houses was but slight and about one-sixth of the fleas from the same houses was found infected.

A comparison of the degree of infectivity of houses in which plague rats had been found and other houses near resulted in showing the latter to be more infected. Kitasato explains this by stating that rats rove a good deal and of this he gives a striking illustration.

He shows how useless ordinary disinfection of houses is in getting rid of fleas and the great value of rat proofing for the purpose. His figures bearing on this point are very striking.

He believes the plague germ may be best detected by the guinea-pig test and this constitutes one of the most important factors in plague prevention.

W. J. P.

Wu Lien Teh [G. L. Tuck]. **Investigations into the Relationship of the Tarbagan (Mongolian Marmot) to Plague.***—*Lancet.* 1913. Aug. 23. pp. 529-535. With 4 text-figs: and *Jl. Trop. Med. & Hyg.* 1913. Sept. 15. Vol. 16. No. 18. pp. 275-280.

The foundation of the Manchurian Plague Prevention Service as a result of the recommendation of the International Plague

* Abstract of paper read at the International Congress of Medicine, 1913, Section of Tropical Medicine and Hygiene.

Commission is briefly described. Many of the delegates of that commission believed that the marmot was closely connected with the spread of plague. As a result of this belief the author organized an expedition into the regions where marmots abound, to see what justification could be found there for the view. He describes the itinerary of this expedition. The Chinese expedition worked for some little time in conjunction with a Russian expedition under Zabolotny. The centres of work were Manchouli in Manchuria, Borsja in Siberia, and Charhada and other places in Mongolia. The housing of the hunters is dealt with at full length and is shown to be as bad as possible from the hygienic aspect. Rumours from various localities of mortality amongst tarbagans were acted upon in directing the search, but in no case was a plague infected animal (living or dead) found. Apart from one such naturally infected animal described by Zabolotny there seems to be no definite evidence of plague naturally occurring in the tarbagan. A description of the tarbagan (*Arctomys bobac*) is given. The author found on the captured tarbagans fleas and ticks; all the fleas were of one type (*Ceratophyllus silvantievi*) and these were shown to bite the human subject, though they were not apparently very anxious to do so.

The author concludes that the direct relationship of the tarbagan to human plague may be looked upon as negligible.

W. J. P.

Bulletin de l'Office International d'Hygiène Publique. 1913. Sept. Vol. 5. No. 9. pp. 1544-1551.—**Prophylaxie de la Peste dans le Gouvernement d'Astrakhan (Russie).** (Communication de la Commission Impériale pour la Lutte contre la Peste.)

In 1877 an epidemic of plague appeared in Astrakhan. From that date till 1899 the district remained free, but from 1899 to this year plague has appeared each year in the same tribe of Boukeiv. According to careful enquiries it appears that the epidemics are due to some local latent nucleus of infection.

Although the causation and mode of propagation still remain doubtful it appears probable that the hamster plays a great part in the dissemination of the disease in this region.

Plague infection of the camel was proved to occur and also individuals who had eaten the flesh of infected camels died of the disease. In consequence of these facts a commission was appointed to examine the part played by the camel in the spread of the disease; out of 15,000 examined not a single infected animal was found.

The government of Astrakhan, recognising the part played by the hamster, suggested a government grant for destroying this pest but in this they were opposed by the council of the empire who held that the role played by the hamster was not sufficiently

demonstrated to warrant this; in consequence a special commission of the Imperial Institute of Experimental Medicine has been charged to solve this problem.

W. J. P.

Lurz (Richard). **Eine Pestepidemie am Kilimandscharo im Jahre 1912.** [A Plague Epidemic on the Kilimanjaro Mountain, German East Africa.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Sept. Vol. 17. No. 17. pp. 593-599.

A general description of the administrative arrangements of the district and nature of the inhabitants is followed by a few historical notes on plague as locally observed. Some doubt appears to exist as to whether the plague raged in 1898 in the part of the colony under discussion. In March, 1912, however, plague broke out and was identified by bacteriological as well as clinical investigation.

In Gasseni 55 natives died of pneumonic plague between 15th March and 14th April and three died of bubonic plague in the same time. In Usseri Kwai Demassi eleven died of pneumonic plague about the same time. Incubation period was one to three days, the disease lasted one day as a rule and the mortality was 100 per cent.

The usual methods of control and burning of the plague infected huts were adopted as control measures. Very few rats were present in the infected region and no marked mortality was observed amongst them. The type of rat found in the huts was almost exclusively *Pelomys fallax iredescens* (Heller). Around the huts many tree rats were found; field rats were also common. The latter were never found infected with plague though they are susceptible to it.

The fleas found on the men, rats, and dogs are described, *Loemopsylla cheopis* and *Sarcopsylla gallinacea* being the most frequent. Of nearly 3,000 house rats examined 36 were found plague infected while three infected tree rats were found in an examination of 3,297. Over 3,000 house rats in the southern portions of the colony were examined and no plague infected animal found amongst them.

Rat and mouse destruction was carried out very thoroughly, over 30,000 being killed in nine weeks. The holes of rats were dug out in their entire length so that but few rats of infected houses could have escaped. Attempts to use guinea-pigs as traps for infected rat fleas were not successful in a house where a case of plague-pneumonia had died.

W. J. P.

Meyer (Carlos). **Instituto Bacteriologico do Estado de S. Paulo. Relatorio sobre a Administracao e os Trabalhos do Instituto durante o Anno de 1912.**—*Revista Med. de S. Paulo.* 1913. Feb. 15. Vol. 16. No. 3. pp. 56-61. [Bubonic plague, p. 58.]

During the year 1912, 135 rats were examined in the capital for plague, of which 12 were found to be infected. Meyer suggests that large numbers should be examined daily instead of small irregular numbers as heretofore.

Seven samples of lymph from glands of suspected plague cases gave one positive result. The bacillus was isolated and identified.

Suspected material examined showed three positive cases in Quiririm, three in Redempcao and eight in Taubaté.

Plague pneumonia was suspected in a case in the isolation hospital of the capital but the examination of sputum was negative.

The staff of the institute made autopsies in five cases of plague; cultures were obtained in each case.

W. J. P.

Montel. **Lésions Bucco-Pharyngées dans la Peste.** [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.* 1913. July-Aug.-Sept. Vol. 16. No. 3. pp. 779-781.

This short note gives an account of five patients who suffered from plague at Saigon in 1908. These patients all showed cervical adenitis as a result of lesions of the mouth and pharynx; the lesions were principally tonsillar and clinically similar to diphtheria. Montel believes the tonsils constituted the point of entrance of the infection.

W. J. P.

Piras (L.). **Die Präzipitinreaktion als diagnostisches Mittel der Pest.** [The Precipitin Reaction in the Diagnosis of Plague.] —*Centralbl. f. Bakt.* 1. Abt., Orig. 1913. Sept. 27. Vol. 71. No. 1. pp. 69-80. With 1 text-fig.

It has been shown by Kister and Shumacher that dead plague-infected rats kept at a temperature of 20° C. are liable after seven days to give a negative result if an endeavour is made to prove by culture or animal inoculation that they are infected. Grysez and Wagon stated on the other hand that extracts of old plague-infected tissues specifically deviate complement in the presence of an anti-plague serum.

Piras has controlled these last results. He used an extract in carbolized saline. He found that the specific deviation of complement only took place up to the sixth day after death and was consequently no more useful than the "Inoculation of Animals" test. He then attempted to get positive results by the precipitin test. His preliminary experiments against a good serum showed that the precipitinogen was present in highest concentration in the liver and spleen and for his further experiments he confined his attention to mixed extracts of these organs.

His work shows that a specific precipitinogen is present in the cadavers of experimentally plague-infected rats and guinea-pigs even when very advanced putrefaction has set in and this specific body can be easily identified even up to 68 days after death. The same body is present in the faeces of plague infected animals. This method can be used after all other methods have become quite useless owing to advancing decomposition.

Piras obtained constant results using sera from different outside sources and in addition sera made by himself. The fact that

the precipitinogen is present in faeces may enable one to determine the presence of disease in rats though no infected rats have been caught.

W. J. P.

Rats in relation to Plague.

Robinson (George H.). **The Rats of Providence and their Parasites.**—*Amer. Jl. of Public Health.* 1913. Aug. Vol. 3. No. 8. pp. 773-776.

From July, 1912, to January, 1913, 341 rats were examined; 333 of these were the brown rat (*Mus norvegicus*). The sizes varied from 7 to 18 inches and 59 per cent. of the rats were adults. 195 of the rats harboured amongst them 2,053 fleas, *i.e.*, 11 per infested rat. One rat had no less than 300. 75 per cent. of the fleas were *Xenopsylla cheopis* and 22 per cent. *Ceratophyllus fasciatus.*

The fleas were found fairly equally distributed over the rats, whereas in Australia they were mainly found on the head and neck regions and in San Francisco they were most prevalent on the hinder quarters of the animals. In cold weather the fleas tend to accumulate on the more thickly furred portions of the body. The total number of fleas present was markedly reduced in the cold weather.

21 per cent. of the rats were infested with mites. The common rat louse was found on 24 per cent. of the animals.

The liver in 7 per cent. of the rats showed the encysted form of the cat tapeworm *Taenia crassicollis.* These were especially frequent in rats taken from the local meat markets.

W. J. P.

Heiser (Victor G.). **The Rats of our Cities. What becomes of the Carcasses of Rats dying Natural Deaths?**—*U.S. Public Health Reports.* 1913. July 25. Vol. 28. No. 30. pp. 1553-1554.

This short paper takes the form of a conundrum. It is pointed out that the rat census of a city is usually supposed to equal the human, further that the average life of a rat is five years. Now if only one rat be allowed for every two inhabitants in Manila there must be an average daily mortality of 82 rats. Refuse disposal in Manila is practically confined to that which occurs at the public crematory, as stoves in houses are unknown there and fires are most primitive owing to the high price of fuel. A sanitary officer was stationed at the crematory for one month and only discovered in the refuse one dead rat out of the 2,500 that died during the month. Heiser pertinently asks what became of the rest. If they were eaten by their fellows portions of carcasses and skeletons would be found in sanitary work but they are not. They don't die in the drains as they are a closed system. Gangs of men employed in killing rats practically never find dead ones unless poison has been laid. This puzzle is not elucidated by the author.

W. J. P.

Foy (F. Arthur). **Destruction of Rats in the Port of Rangoon.**—*Brit. Med. Jl.* 1913. Aug. 23. pp. 439-441.

The author first enumerates the occasions calling for the destruction of rats in vessels in plague prophylaxis. These are (1) When the vessel is plague infected. The plague infection may be a human case. The occasional difficulties of justifying rat destruction from this cause are dealt with. The case may not be sufficiently advanced to admit of exact diagnosis, or the patient may be reported as suffering from plague after having left the ship, the reloading of which may have already commenced; moreover the human case may not have infected the rat population of the vessel. If the plague infection be of rats as indicated by definite rat mortality it is obviously very necessary to destroy the rats. No such cases have been reported by commanders of vessels entering the port. The author suggests that routine trapping and bacteriological examination of rats on vessels would be a valuable index to the need for rat destruction.

(2) Rat destruction is discussed as a routine procedure, when the vessel is undergoing annual repairs and refits. In Rangoon this does not occur to any great extent as Rangoon is not the headquarters of many of the shipping companies.

(3) Routine rat destruction when a vessel is going to a port which makes this a condition of admission to the port.

Different methods of rat destruction are discussed and a number of experiments recorded which however were frequently interrupted from various causes or vitiated by factors beyond the control of the experimenter. In sulphur dioxide fumigation the actual percentage of gas used varied between $1\frac{1}{2}$ and 6 per cent. and rat destruction occurred with percentages as low as $1\frac{3}{4}$ per cent. The plague bacillus was actually found only once amongst the rats obtained from 22 "deratizations" of vessels with the Clayton apparatus. Tabular statements of the numbers of rats and mice found in different vessels, and their distribution *in the vessels* are given.

W. J. P.

Daley (W. Allen). **Rats and their Extermination.**—*Public Health.* 1913. Oct. Vol. 27. No. 1. pp. 23-28.

The paper is an account of the present position of our knowledge on the subject. There are few new facts. The different types of rat which play a part in plague transmission are described and their geographical distribution considered. The types and prevalence of rat fleas are also described. A section dealing with rate of increase of rats and the economic damage they cause is also given. The occurrence of rat plague without human plague is discussed and shown to be due to the fact that *Mus decumanus* shuns man whenever possible, while on the other hand *Mus rattus* is closely associated with man. Illustrative cases of this point are given.

The diagnosis of rat plague is next discussed and the points observed in post-mortems of infected rats reviewed. The Rat Laws of several countries are passed in review and also the various methods of rat destruction.

W. J. P.

Strickland (C.). **The Bionomics of the Rat-Flea.** [Correspondence.]—*Brit. Med. Jl.* 1913. Aug. 16. p. 435.

This letter deals with the question of the longevity of the fasting rat-flea. Strickland from personal observation came to the conclusion that adult fleas could live in hygroscopic rubbish for eighteen months. Bacot's criticism of this view was unfavourable and he attributed the facts observed by Strickland to long larval rests within the cocoon.

In this letter Strickland returns to the question. He believes Bacot has no evidence of value showing that fleas are unable to live a great length of time in the conditions of his experiments. Further Bacot has no evidence of larvae living in the resting stage eighteen months, his periods of observation never extending over 400 days. Strickland was also able to show *Trypanosoma lewisi* in several of his fleas which had fed on an infected rat eighteen months previously. It appears more experimental research is needed on the point.

W. J. P.

MYIASIS.

Francaviglia (M. C.). **Altro Caso di Myiasis nell'Uomo per Larva cuticolare d'*Hypoderma bovis* (De Geer).** [Another Case of Human Myiasis due to the Larva of *Hypoderma bovis*.]—*Policlinico*. Sez. pratica. 1912. Oct. 27. Vol. 19. No. 44. pp. 1593-1595.

Three cases which have occurred in Catania are referred to, one described in 1878 by Berretta, another in 1904 by the author, and the present one. The patient was a peasant child, fourteen years of age. In the beginning of October, 1911, a radiating pain began in the region of the umbilicus. After purgatives this decreased in intensity, but quickly returned, being more severe then than at first and now accompanied by fever. About the same time pain appeared in the right parietal region and a swelling about the size of a hazel nut developed from which a small white larva eventually escaped. Unfortunately this was not kept. About a month later a similar swelling appeared over the sternum and another larva was recovered. This on examination proved to be the young stage of the fly *Hypoderma bovis* (de Geer). Nothing appeared at the site of the original pain in the abdomen and the author thinks it may only have been due to some dietetic error.

[Dermal myiases due to the *Hypoderma bovis* are common in cattle. Though rare in man cases have been reported from time to time. The eggs of the fly after being laid on the skin of the animal are licked off by the tongue and so find their way to the mouth and alimentary canal. From here the larvae are supposed to bore their way through the oesophagus and finally come to rest under the skin forming tumours. Escaping by ulceration they fall on the ground, become pupae, and so develop into the adult fly.]

G. C. Low.

Balzer (F.), Dantin, & Landesmann. **Un Cas de Myiase rampante due à l'*Hypoderma bovis*.**—*Bull. Soc. Française de Dermatol. et de Syphiligraphie*. 1913. April. Vol. 24. No. 4. pp. 219-226. With 3 figs.

The case was that of a young girl born in Brittany who was employed in looking after cattle which had come for the most part from Scotland, Denmark and Norway. Later she came to Paris where a diffuse swelling developed above the right ear. This was accompanied with severe pain. Some days later the pain became localised to the inferior right temporal region just above the ear, and next a small orifice appeared from which the extremity of a mobile larva could be seen protruding.

Some days later the patient began to suffer from swelling and pain above the left shoulder. From this site another larva was recovered. Finally a third specimen appeared in the region of the right anterior superior iliac spine. Brumpt to whom the larvae were shown identified them as those of *Hypoderma bovis*. The authors remark that French literature is not rich in cases of

this nature. Two cases, occurring also in Brittany, have however been observed and published by Topsent. In the first instance, a young girl of eight years, who lived in proximity to cattle, was attacked. The second case observed was also in a girl, six years of age, who lived on a farm with her parents. In the work of Dubreuilh the authors have found five cases mentioned, these having been observed in Belgium, Italy and Germany. Three of these were cases of infection with *Hypoderma bovis*, two with *Hypoderma diana*. Other cases have been observed by MacCalman, and Walker in the Shetland Islands and by Murray in Ireland.

[Francaviglia's paper (see above) furnishes further examples.]

G. C. L.

Rudell (G. L.). **Creeping Eruption. Two Cases with Recovery of the Larvae.**—*Jl. Amer. Med. Assoc.* 1913. July 26. Vol. 61. No. 4. p. 247. With 3 figs.

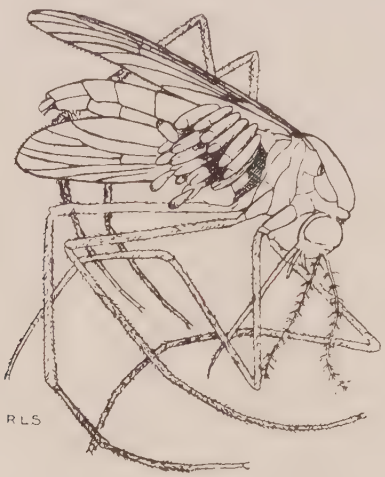
Creeping eruption, according to the author, is a very rare disease and the recovery of the larva producing this curious lesion is rarer; only two reports are to hand of their discovery. The author records two cases seen by himself, particularly because in one of them, in which there were two of the lesions, both larvae were recovered. One was found 2 mm. from the inflamed end of the line, its position being indicated by a small dark spot. Lifted out and placed under the microscope its movements, which were limited to a maggot like wriggling, could be studied. The second specimen was recovered in a similar way to the first. A photograph of the boy with the line like lesions on his face is given, also a microphotograph of the larva found in the case, together with Sokolow's drawing from Pusey's Dermatology of the larva of creeping eruption. [The author does not seem to have had his larvae identified. This would be interesting, and as he has them mounted in glycerin, is still possible.]

G. C. L.

Surcouf (Jacques). **La Transmission du Ver Macaque par un Moustique.**—*Compt. Rend. Acad. Sci.* 1913. May 5. Vol. 156. No. 18. pp. 1406-1408. With 2 text-figs.

It is pointed out that in spite of the frequency of Ver Macaque tumours, we are still ignorant of the method in which these parasites, the larvae of *Dermatobia cyaniventris*, reach their host. In 1900 Blanchard observed the presence of packets of eggs attached to the abdomens of mosquitoes from Central America. Morales of Costa Rica next believed that the Dermatobia laid its eggs directly on the abdomen of mosquitoes and that the larvae were transmitted to vertebrates when the mosquitoes sucked their blood. This assertion would explain the term *Gusano de Zancudo* and *Ver de Moustique* [Mosquito Worm of British Guiana] given by the Venezuelans to the Ver Macaque. The author points out however, that it seems incredible that the Dermatobia, which is as large as a blue-bottle fly, could lay its eggs directly on the

mosquito. Rincones of Caracas believes that the eggs are laid on damp leaves in wet damp places frequented by the *Janthinosoma lutzi*, the mosquito which would appear to act as the carrier.



Janthinosoma lutzi ♀ carrying eggs of *Dermatobia cyaniventris* Macquart (×6½).

The packets of eggs are enclosed in a strongly adherent cement substance which becomes softened and viscid when placed in water, and by this means they are supposed to become attached to the wall of the mosquito's thorax [*Vide* diagram.] There they ripen and opening give birth to a larva which wriggles in under the skin by way of the puncture made by the mosquito. Tovar of Maturin, Venezuela, observed such mosquitoes carrying these eggs and by placing them upon animals obtained furunculous tumours. These, when excised in eleven days, showed in each a typical mosquito worm, from which ultimately emerged a typical adult *Dermatobia cyaniventris* fly.

[This is a very interesting note and it would seem from it that the puzzle of the passage of the larva of the Dermatobia to man and other animals had been solved.]

G. C. L.

Zepeda (Pedro). **Nouvelle Note concernant les Moustiques qui propagent les Larves de** *Dermatobia Cyaniventris* **et de** *Chrysomia Macellaria* **et peut-être celle de Lund, et de la** *Cordilobia Anthropophaga*. — *Rev. de Méd. et d'Hyg. Trop.* 1913. Vol. 10. No. 2. pp. 93-95.

The inhabitants of the Atlantic coast of Nicaragua talk with terror of a mysterious mosquito, which inoculates by its puncture a larva of variable dimensions and form. The puncture is not noted for the first few hours but after this, pain, redness and oedema appear. After 24 hours a furunculous tumour of a red colour and a hard consistence develops. Incision of this reveals the presence of the larva of a fly.

The author in studying the question observed on some mosquitoes [varieties not stated] white masses disseminated on the femur and on the pro-thorax and antennae. The bites of such insects produced the characteristic tumours with symptoms more or less severe, inflammation and suppuration. In the case of a young man of 24 years, of good constitution, bitten on the left forearm, violent inflammation occurred ten hours afterwards. The day after that the pain was intolerable though the tumour had not developed much in size. The temperature was raised to 100° F. The author then intervened and extracted the larva, applying antiseptic dressing to the wound. Cicatrisation quickly occurred and all the symptoms disappeared. In another case the larva developed but with much less acute symptoms. It came out in seven days and after this healing was rapid. An examination of the mosquitoes demonstrated to the author that the white masses or protuberances were the larvae and eggs of *Dermatobia cyaniventris*.

Further experiments gave the same results, but in one of these the author was surprised to see two perforations in the tumour from which a whitish liquid exuded. The larva extracted was different in appearance to those seen before and was finally identified at Philadelphia as that of the *Chrysomyia macellaria*. [This is specially interesting.]

As to how the eggs and larvae of the fly reach the mosquito, the author believes that they become attached to it when it settles on rotting bananas and other putrefactive material.

[It will thus be seen that Zepeda's observations bear out those of Surcouf *vide supra*.]

G. C. L.

Neiva (Arthur) & Gomes de Faria. **Myiasis humana, verursacht durch Larven von** *Sarcophaga pyophila* **n. sp.** [Human Myiasis, caused by Larvae of *S. pyophila*.]—*Mem. Inst. Oswaldo Cruz.* 1913. Vol. 5. No. 1. pp. 16-22.

The case occurred in a young girl, ten years of age, who had sustained contusion on the right parietal region. The wound suppurated and in the pus fly larvae were ultimately found. The authors believe that the species is a new one and described it under the name of the *Sarcophaga pyophila*, n. sp. The type has been preserved in the Oswaldo Cruz Institute. It is pointed out that the most common forms of myiasis in Brazil are those due to *Chrysomyia macellaria* and *Dermatobia noxialis* [= *cyaniventris*]. The first infection is known locally as *bicheira* or *bicheiro*, the latter as *berne* or *ura*. The following Sarcophaga have been found in human myiasis:—*S. carnaria*, *magnifica* and *latifrons* in Europe, *ruficornis* in India, *lambens* in Brazil, a sp. (?) in British Guiana by Daniels and now the new species *pyophila* described above.

[The Sarcophagidae are the common blow-flies, *S. carnaria* being the one most usually met with in Europe. Attracted by

the foul smell of ulcers or other lesions in the human subject the flies sometimes deposit their eggs on such sites and these developing into larvae give rise to this form of myiasis.]

G. C. L.

de Moura (Cursino). **Myiase do Seio.**—*Revista Med. de S. Paulo.* 1913. Jan. 15. Vol. 16. No. 1. p. 1.

A case of myiasis of the breast in a patient who suffered from an ulcerating cancer affecting both of these organs. The larvae, according to the author, were those of a fly locally known as "Mosca varejeira" = *Musca putrida* L. The presence of the larvae caused a further destruction of the tissues of the already diseased breasts.

G. C. L.

Heckenroth (F.) & Blanchard (M.). **Note sur la Présence et l'Endémicité d'une Myiase furonculeuse au Congo français.**—*Bull. Soc. Path. Exot.* 1913. May. Vol. 6. No. 5. pp. 350-351.

Observations made by one of the authors in different regions of the Congo, over many years, have enabled him to establish the rarity of the ver du Cayor [*Cordylobia anthropophaga* E. Blanchard] in these parts. Two cases of furuncular myiasis were, however, met with in the regions of Sangha and n'Goko, one of these in 1907, at Nola, in a European who had two larvae in his left arm, the other at Brazzaville. These were both attributed at the time to the *Cordylobia anthropophaga*, but the authors now think that they may really have been due to *C. rodhaini* described by Gedoelst. This species exists all over the Belgian Congo, notably at Leopoldville, but so far has not been described in the French Congo. A dog belonging to one of the patients was also affected.

G. C. L.

Rodhain (J.), Pons (C.), Vandenbranden (F.), & Bequaert (J.). **Rapport sur les Travaux de la Mission Scientifique du Katanga, Oct. 1910 à Sept. 1912.** pp. 171-186. (Observations sur la Dispersion Géographique et la Biologie du "Ver de Case" (*Auchmeromyia Luteola* F.) et du "Ver du Cayor" (*Cordylobia Anthropophaga* Grünb.).)—1913. Brussels: Hayez, Imprimeur de l'Académie Royale. [Royaume de Belgique—Ministère des Colonies.]

Observations made upon the *Auchmeromyia luteola* (Ver de Case) have demonstrated that this fly is oviparous. From the egg which is laid on damp soil a larva eventually emerges [the Congo floor maggot]. This creature is very active, disliking the light and rapidly escaping from it into the dust or earth. In the soil of different villages numerous larvae at different stages and pupae were found. The geographical distribution of the fly is a wide one, many parts of the Congo harbouring it.

The means of entrance of the larva of the *Cordylobia anthropophaga* under the human skin were demonstrated. At the moment of the exclusion of the egg from the fly one of the poles opens irregularly and a very small mobile larva emerges.

One of the authors placed such a larva on the skin of his arm and the following points were noted:—Without displacing itself the parasite sought immediately to penetrate through the intact skin. It attacked this with its buccal hooks and rapidly buried itself in the thickness of the epidermis. In three and a half hours it was already half way through the skin, penetrating this obliquely and producing a slight swelling. In six hours it had passed completely through. The penetration was accompanied by a very slight pricking sensation and itching. After this it was only with difficulty that the orifice with the posterior extremity of the larva was seen.

Unfortunately in this individual instance pressure was made on the spot and the larva came out of the skin and, though placed again on it, did not penetrate but died. Similar experiments on monkeys and dogs resulted in infection.

The authors however believe that the fly only rarely lays its eggs direct on man or other animals. In the majority of cases it would seem to deposit them on the ground where there is an animal or human odour. This would explain the localisation of the tumours, which are so often found in parts of the skin which have come in immediate contact with the soil and also the fact of the larva never being encountered on the backs of animals. Two cases of infection in Europeans are described. No cases of myiasis due to the *Cordylobia rodhaini* (Lund's larva) were noted.

G. C. L.

Sergent (Edm. & Et.). **La "Tamné," Myiase Humaine des Montagnes Sahariennes Touareg, identique à la "Thimni" des Kabyles, due à** *Oestrus ovis*.—*Bull. Soc. Path. Exot.* 1913. July. Vol. 6. No. 7. pp. 487-488.

The authors call attention to the fact that in 1907 they showed that the *Oestrus* of the sheep was frequently met with in the conjunctiva and nasal cavity of man in certain elevated regions of Kabylie, where the number of sheep as compared to the number of people was small. The presence of these larvae produces very disagreeable symptoms.

The Kabyles call the fly *Thimni*. In the Central Sahara in the Ahaggar mountains the people are also much annoyed in spring by flies which deposit their eggs in the conjunctiva and nasal mucosa and the name given to the fly there is *Tamné*. These names the authors show are synonymous and both apply really to the *Oestrus ovis* Lin. 1761.

G. C. L.

Edgar (C. L.). **A Case of Screw-Worm in the Nose.**—*Texas State Jl. of Med.* 1913. May. Vol. 9. No. 1. p. 21.

Details of the case are given. Clinically there was a bloody, watery discharge from the nose which had a very offensive odour.

Many maggots were present. Treatment was by chloroform inhalations, these proving efficacious. The patient then returned home but later developed severe nasal haemorrhages from which he died. The larvae were those of the *Chrysomyia macellaria* Fab. 1794.

In Texas, according to the author, the life of this fly extends from June until autumn. The female is oviparous and lays from 200 to 400 eggs at one laying. These hatch in about nine hours and the larvae develop very rapidly. The female fly when ready to deposit her eggs is attracted by any foul odour, such as a foul smelling discharge from the nose or other situation, and does not require to remain very long in any one particular place in order to deposit her eggs.

In the wound the larvae are found burrowing for from four to six days, after which they leave this site and crawl into the earth, there transforming into the quiescent pupal stage. After this stage has lasted for one or two weeks the mature fly appears. From two to three weeks are therefore required for the entire life cycle.

G. C. L.

Field (F. E.). **Myiasis: With Special Reference to some Varieties Treated at the Georgetown Hospital.**—*Brit. Guiana Med. Ann. for* 1911. pp. 60-64. [1913. Demerara: printed by "The Argosy" Co., Ltd.]

Myiasis has been recognised for many years in British Guiana, though previous to 1902 it is not specially mentioned in annual reports, being included with many allied infections under the heading parasites. Since that date statistics from the principal hospitals of that country show a number of cases, varying from 4 to 12 per annum, the death rate from all forms of the infection working out at about 12 per cent. Of 15 cases treated in the Georgetown public hospital the following details are given: six were 50 years of age or over, four 40 to 50, four 30 to 40, and one between 25 and 30. In all debility was present and all possessed a history of a previous diseased condition.

The infecting fly in some of the cases was, according to Wise, as follows: (1) *Chrysomyia macellaria*, (2) *C. violacea*, (3) *Calliphora erythrocephala*, (4) *Sarcophaga carnaria*. The commonest was the first, in the proportion of six to one. When the larvae of this fly are placed in a bottle containing cotton wool, pupae appear in 24 to 48 hours, while the full sized flies are hatched in another eight days.

A series of clinical observations in some of the cases observed is given. Diagnosis is usually made by the odour alone, the patient having a smell of putrid meat which is unmistakeable. This together with a sanguineous discharge from the nose or the presence of an inflammatory condition is very suspicious and can be verified by the actual finding of the larvae.

As regards treatment, early removal of the larvae is essential. When they are in the nose warm boracic lotion, 1 in 24, or carbolic lotion, 1 in 60, are recommended. When the sinuses are also affected surgical measures become imperative.

[The paper refers to one form of myiasis only. No mention is made of the larvae of *Dermatobia cyaniventris*, locally called mosquito worms.]

G. C. L.

Hall (M. C.) & Muir (J. T.). **A Critical Study of a Case of Myiasis due to *Eristalis*.** — *Arch. Internal Med.* 1913. Feb. 15. Vol. 12. No. 2. pp. 193-202.

A child, five years of age, had been ailing for about ten weeks and was being treated for indigestion and constipation. Emaciation and anaemia were pronounced while nervous movements, such as twitching of the eyelids, grinding the teeth and convulsive movements of the limbs, were also present. The breath had a very foul odour.

A diagnosis of worms having been made, a dose of a proprietary remedy was given and a "rat-tailed larva," of the family *Syrphidae* of the order Diptera, was passed in the stool. The authors rightly point out that one has to be cautious in accepting the presence of fly larvae in faeces, the ease with which these may get into the faeces after it is passed being well known. They think however that their case was an authentic one, especially so as after the expulsion of the larva the child's health improved and the nervous symptoms disappeared.

They give a summary of seven published cases of the same infection known to them. These are as follows:—Odhelius's case of *Helophilus pendulus*; Wagner's case of *Eristalis arbustorum*; Leidy's case of *Eristalis* sp (nasal); Riley's case of *Eristalis dimidiatus* and case of *E. tenax*; Shattock's case of *E. tenax* and McCampbell and Corper's case of *E. tenax*. To this list should be added the case recorded in this paper [*?E. tenax*], the four cases from man recorded in the files of the Bureau of Entomology, and the one case from man and one from the cow (vaginal) recorded in the files of the Bureau of Animal Industry.

G. C. L.

Candido (G.). **Anchilostomoanemia associata a Miasi intestinale.**— *Ann. Med. Navale e Colon.* 1913. Apr. Vol. 1. No. 4. (Anno 19.) pp. 394-407. With 1 fig.

It was not possible to breed out the fly from the larvae found in the faeces as they were always dead. Their macroscopical and microscopical appearances, however, were sufficient to enable one to say that they were those of *Calliphora vomitaria*, one of the common blow flies or blue bottles. Purgatives and antiseptics were successful in the treatment. [Infections with this fly have fairly often been described. The eggs are supposed to be ingested with vegetables or other food.]

G. C. L.

Jones (Glenn I.). **Hepatic Abscess (Non-Amebic) and Gastro-Intestinal Myiasis.**—*Jl. Amer. Med. Assoc.* 1913. Oct. 18. Vol. 61. No. 16. p. 1457.

The case was a fatal one of a single liver abscess, destroying the entire right lobe of the liver, but containing no amoebae. While the patient was being operated upon, gastric lavage was practised with a view of ameliorating the hiccough and anorexia which were present. The stomach contents contained between 20 and 30 living larvae of *Musca domestica*. Another case of intestinal myiasis was accidentally encountered at the Jolo Hospital, Philippine Islands, where the present case had been before his operation.

[The fact of the abscess being a single one and occurring in the Philippines is certainly suggestive of an amoebic origin. The coincidence of the larva of flies in the stomach is interesting, but means nothing.]

G. C. L.

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